E M. Baker

The Monthly Review of the AMERICAN ELECTROPLATERS' SOCIETY

CONTENTS

Christmas Greetings from our Founder 919

Diecastings Shine in '41 (Reprinted from Nov. 25, 1940, issue of *Steel*) 920

Blum—What Metals can be Electrodeposited from Aqueous Solutions? 923

Maner—Toward Better Foremanship 931

Year Index 938

Here and There 940

Branch News 946

The Abstract Section 970

Index to Advertisers 978

Membership Report 980

Membership Campaign 981

Buyers' Guide 988

Branch Directory 992

DECEMBER 1940

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Christmas Greetings from our Founder

As the Christmas Season approaches I am thinking of all members of the A.E.S. wherever they may be located, in America, in Canada, and distant lands and send to them, through the Christmas MONTHLY REVIEW, my Sincerest Wishes, that all may enjoy a Very Merry Christmas and A Happy and Prosperous New Year. May Good Health be the Wealth of each member and in America Peace on Earth and Good Will to all.

CHARLES H. PROCTOR,
Founder of the A.E.S.,
Twin Palms, Clearwater, Fla.

The Officers of the Supreme Society extend the best wishes of the Season to our Members, Advertisers and Subscribers to the Monthly Review.

May each of you enjoy a Merry Christmas and look forward to a bright and Prosperous New Year.

The Executive Board

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Diecastings Shine in '41

Reprinted from Nov. 25, 1940, issue of *Steel*

ZINC alloy diecastings, most of them heavily plated with nickel and chromium, furnish more of the highlights on 1941 editions of American cars than in any prior year. Hidden below the surface and usually requiring no applied finish, there also are a greater number of diecastings than before. As a result, every diecaster equipped to handle automotive business finds his plant at maximum capacity. One reports more than 200 new dies in service and many other shops nearly equal this record. Plants with facilities for plating diecastings in large quantities and to exacting specifications are correspondingly busy.

Except for front and rear bumpers, diecastings dominate among plated external parts. They also contribute to enameled areas. In interiors, where much more bright trim is used, diecastings again furnish most of the highlights. Several cars have instrument panels covered with diecast grilles, frames, moldings and glove doors. Even knobs formerly in plastics have reverted to diecastings. Steering wheels carry their complement of brightwork over diecast surfaces. Hardware continues mainly diecast.

Examining the interiors of such cars as Buick and Olds reveals large castings which include not only the radio grille but which also provide housings or frames for adjacent units. Many makes, including some Chryslers, have diecast glove doors, some with a separate or integral frame for a clock. A few have large areas covered with wood graining set off by bright integral moldings. Buick, Mercury and many General Motors cars use diecast knobs, some with decorative plastic inserts. As heretofore, diecast instrument frames are popular. Pontiac, for example, uses a frame duplicated right and left for clock and speedometer units, respectively.

Many horn rings have given place to sectors to leave the two upper quadrants of the steering wheel open—an aid in viewing instruments. Both full rings and sectors are usually diecast. Also there is the decorative steering wheel cap with integral extended arms easily reached by the thumbs. Some Mercury,

Nash and Pontiac cars use this control, decorated with plastic parts added to the diecasting.

Cadillac for the first time is using wide interior diecast moldings at the belt line. Some are from the same dies as running board moldings. Exterior moldings in some models extend across fender skirts and wheel covers. Many cars make use of diecast interior trim, especially for medallions on the garnish molding below windows.

Some models of Packard, Chrysler and Lincoln are among those equipped with new hydraulic window lifts. An electric switch, when moved up or down, results in corresponding movement of the respective window. Several diecast parts in this system constitute new mechanical applications.

There is an increased use of direction signals with diecast housings for control parts on the steering column and for signal lights. Automatic transmissions used in combination with fluid drives, including those on some Chrysler makes and on Olds, have diecast parts. Other diecastings are used with vacuum shifts, now standard on Chevrolet and available on other makes. Practically all cars have diecast brackets for shifter lever shafts and some for parts of the lever itself or for other portions of the shifting hookup.

Radiator grilles continue most prominent in front end styling. A preponderant number are diecast as heretofore. With the exception of Cadillac and Olds, which make use of a large one-piece diecast grille, and the Willys "Americar," which uses an entirely different design extending straight across the front below hood level, the grilles are all cast in two or more sections. Chrysler and Dodge have gone back to the diecast form and Pontiac to a new design in stamped form. Ford's use of diecast grille sections is extended and Chevrolet is using, for the first time, a grille in which the frame is diecast, in six sections. This leaves all cars in the low price group, except Plymouth, with grilles which are partly or fully diecast, likewise all cars in higher priced brackets except Pontiac. Hence grilles alone will account for a large tonnage of diecastings.

Most grilles are flanked by headlamps with diecast bezels. Some include openings for parking lights or direction signals. In others, the parking lights are separate diecastings with a long integral streamlined tail for fender ornamentation in certain

designs. A new note is struck by Cadillac where a combination casting serves as a tail light housing and cover for the gas tank filler cap. Other new uses of diecastings in lighting equipment include reflector housings for "courtesy" lights and bezels for dome lights.

Buick and Olds are among cars having diecast fittings on fenders to provide high-lighted "speed lines"—lines to accentuate the appearance of speed and length. Many hoods have diecast fittings. Other diecastings take the place of louvres. Diecast car name or model designations add a decorative touch. Some body and hood moldings are diecast because the final plating in chromium perfectly matches other adjacent diecast parts.

Buick's use of two carburetors means a further increase in diecastings under the hood. There, too, are many other diecastings about which the average car owner knows little or nothing. These complex castings, rapidly and accurately produced in dies, play an important function in reducing costs without any sacrifice in quality.

CHICAGO BRANCH

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E. A. LANZ,
Secretary

What Metals *Can be* Electrodeposited *From* Aqueous Solutions?

By Dr. WILLIAM BLUM
Chemist, National Bureau of Standards
Presented to the Philadelphia Branch, American Electroplaters' Society, November 23, 1940.

OF the 88 known elements, and the 4 additional ones that are believed to exist but have not yet been identified with certainty, 73 may be considered as metallic and 19 as non-metallic. However, this distinction is not sharp. A few elements like silicon and selenium that are on the border line are called metalloids. Of the metallic elements, only about 15 are now deposited on a commercial scale, although it is known that many others can be deposited. The question is often raised as to what metals might be electrodeposited if there were an industrial or scientific need for such coatings.

In the following attempt to answer that question in the light of present knowledge, the discussion will be confined to aqueous solutions. Certain metals, for example magnesium and aluminum, are produced by deposition from baths consisting of fused salts. Because these baths are necessarily operated at high temperatures, they are generally not adapted to the application of coatings, though such processes have been suggested for special purposes. It is also possible to deposit certain metals from organic solvents. One reason that such baths have not come into practical use is that many of them are decomposed on contact with the moisture of the air.

The following summary of deposits from aqueous solutions is based upon the published papers in this field. No attempt will be made to give exact descriptions of the various processes or coatings, or detailed references for each element. A few interesting examples will be cited, and some of the borderline cases will be discussed in order to indicate the present uncertainties and the difficulty of making an exact classification.

It is necessary to distinguish between the deposition of (1) a metal, (2) an alloy of two or more metals, and (3) a compound; for example, an oxide or a basic salt. In certain electrolyses, all three of these processes may occur in the same operation.

In a broad sense, alloy deposition includes not only the co-deposition of two metals that are in the bath, but also the deposition of a metal upon a cathode with which it forms an alloy. Alloying is most likely to occur when the cathode metal is a liquid. Many metals may be deposited on a mercury cathode, in which they dissolve to form amalgams. The deposition of sodium on a mercury cathode from a sodium chloride solution is the basis of the Castner process for making sodium hydroxide and chlorine.

Although alloys most readily form on liquid cathodes, there is some evidence of alloy formation at the layer of contact between a metal deposit and a solid cathode. The formation of a brittle alloy layer when copper is deposited on a zinc-base diecasting may account for poor adhesion of the copper. Frequently hydrogen is discharged with a metal in which it dissolves; for example chromium, nickel, or palladium.

Oxides (or hydrated oxides) of metals may be deposited on either the anode or cathode. The deposition of lead peroxide on the anode is sometimes used for the analytical determination of lead. Many metals (for example chromium, molybdenum, and tungsten) tend to produce oxides on the cathode during electrolysis of their solutions. Even when metallic deposits of such elements are produced, they may contain some oxide. In fact, very small amounts of oxide are usually present in deposits of iron and nickel, in which they affect the mechanical and magnetic properties.

In any effort to predict on theoretical grounds the possibility of electrodepositing a particular metal, reference would naturally be made to the electrochemical series of standard potentials as listed in Table 1. In this table the elements are listed in the order of increasing ease of deposition; for example, it is easier to deposit copper than zinc. The first conclusion that might be drawn is that metals with potentials above that of hydrogen could not be deposited from aqueous solutions, because hydrogen would discharge more easily. Actually, however, all the metals in Table 1 up to and including manganese have been deposited from aqueous solutions.

TABLE 1.
Standard Potentials of Typical Elements at 25°C.[1]

Elements	*Volts*
Lithium	—2.96
Potassium	—2.92
Calcium	—2.76
Sodium	—2.71
Magnesium	—1.55
Aluminum	—1.33
Manganese	—1.1
Zinc	—0.76
Chromium	—0.56
Gallium	—0.52
Iron	—0.44
Cadmium	—0.40
Indium	—0.34
Thallium	—0.34
Cobalt	—0.28
Nickel	—0.23
Tin	—0.14
Lead	—0.12
Hydrogen	0.0
Antimony	+0.10
Bismuth	+0.23
Copper	+0.34
Rhodium	+0.68
Silver	+0.80
Mercury	+0.80
Palladium	+0.82
Platinum	+0.90
Gold	+1.36

There are evidently very serious limitations to the direct application of the data in this table. The potentials listed refer to hypothetical solutions in which the ion concentrations (or activities) are normal. In simple salt solutions such as sulphates and chlorides the potentials of the metals will be about in this same order, but in cyanide solutions, in which the metal ion concentrations are very low, the order of the metals may change. In any given solution, the relative ease of depositing the metal and hydrogen will depend primarily upon the concentration of metal ions and of hydrogen ions (pH) in that bath.

When these concentrations are taken into account, we would not expect to deposit zinc from an acid bath. The fact that this is readily accomplished is attributed to the high overvoltage of hydrogen. When one metal is plated on another, the relative hydrogen overvoltages on the two metals may determine the efficiency. For example, when zinc is deposited upon copper, the initial cathode efficiency is much lower than after the cathode

1 For completeness this table includes a number of values that are only very roughly known.

is covered with zinc. The presence of even traces of almost any other metal in the zinc deposit will decrease the cathode efficiency. Conversely, it is probable that when tungsten is plated on copper, the initial cathode efficiency is higher than after the copper is covered with tungsten (or tungsten alloy). The co-deposition of another metal (for example, iron or nickel) with the tungsten may produce an alloy deposit with a higher overvoltage and thus permit continued deposition.

Whenever hydrogen is discharged with the metal, the cathode film becomes more alkaline. If the pH increases to a point where the metal hydroxide precipitates, it may deposit on the cathode. Such a process is not strictly electrodeposition, but is more analogous to the deposition of colloids, of which rubber deposition on an anode is an example. The reported presence of magnesium and silicon in certain nickel deposits may be accounted for by inclusion of their oxides.

It is apparent therefore that in order to predict whether a metal can be deposited from a particular solution it would be necessary to know (1) its standard potential (reliably known for only a few of the elements), (2) the metal ion concentration in the solution used, (3) the hydrogen ion concentration, (4) the hydrogen overvoltage upon the cathode metal and upon the metal being deposited, and (5) the pH at which hydrolysis of the metal salt occurs. For the rare or unusual metals, this information is not generally available.

For many years chemists have employed an arrangement of the elements, known as the periodic system, to portray the relations of the elements and their properties. In Fig. 1, (page 927) the elements are listed in the order of their "atomic numbers," which are equal to the numbers of the electrons (outside of the nucleus) within the atom of each element. In general, the vertical rows represent elements with similar chemical properties. The three numbered blank spaces in the table (and the one referred to in the footnote) correspond to elements that are believed to exist but have not been identified with certainty.

G. E. F. Lundell and J. I. Hoffman[2] employed this arrangement to show what metals are precipitated in certain analytical procedures, including electro-analysis. For the latter purpose it is necessary to define conditions under which all of the metal

2 Outlines of Methods of Chemical Analysis. J. Wiley and Sons, 1938. New York.

1 H Hydrogen																			2 He Helium
3 Li Lithium	4 Be Beryllium											5 B Boron	6 C Carbon	7 N Nitrogen	8 O Oxygen	9 F Fluorine			10 Ne Neon
11 Na Sodium	12 Mg Magnesium											13 Al Aluminium	14 Si Silicon	15 P Phosphorus	16 S Sulphur	17 Cl Chlorine			18 A Argon
19 K Potassium	20 Ca Calcium	21 Sc Scandium	22 Ti Titanium	23 V Vanadium	24 Cr Chromium	25 Mn Manganese	26 Fe Iron	27 Ni Nickel	28 Co Cobalt	29 Cu Copper	30 Zn Zinc	31 Gd Gallium	32 Ge Germanium	33 As Arsenic	34 Se Selenium	35 Br Bromine			36 Kr Krypton
37 Rb Rubidium	38 Sr Strontium	39 Yt Yttrium	40 Zr Zirconium	41 Cb Columbium	42 Mo Molybdenum	43	44 Ru Ruthenium	45 Rh Rhodium	46 Pd Palladium	47 Ag Silver	48 Cd Cadmium	49 In Indium	50 Sn Tin	51 Sb Antimony	52 Te Tellurium	53 I Iodine			54 Xe Xenon
55 Cs Caesium	56 Ba Barium	57-71 Rare Earth Metals*	72 Hf Hafnium	73 Ta Tantalum	74 W Tungsten	75 Re Rhenium	76 Os Osmium	77 Ir Iridium	78 Pt Platinum	79 Au Gold	80 Hg Mercury	81 Tl Thallium	82 Pb Lead	83 Bi Bismuth	84 Po Polonium	85			86 Rn Radon
87	88 Ra Radium	89 Ac Actinium	90 Th Thorium	91 Pa Protactinium	92 U Uranium														

*—The rare earths include 15 similar elements, the best known of which is cerium. (No. 61 has not been finally established.)

Fig. 1 — Periodic system of the elements. Those metals enclosed in the heavy line have been deposited in nearly pure form from aqueous solutions. Those enclosed in dotted lines are doubtful. The circles enclose non-metals that can be liberated from aqueous solutions.

can be deposited in a weighable form. As these requirements are not involved in electroplating, the latter process may include more metals than can be quantitatively deposited.

In Fig. 1, the rectangle bounded by the heavy black line encloses 32 known elements that, according to the literature, have been deposited from aqueous solutions. It is interesting that this group of elements almost exactly coincides with that given by Lundell and Hoffman of those metals that form insoluble sulphides. The latter group excludes chromium and includes vanadium and uranium. There is no simple explanation for this close agreement.

The behavior of molybdenum[3] and tungsten[4] is somewhat indefinite. Available evidence indicates that the deposits may contain small amounts of other metals, for example nickel or iron. Further research is needed to determine whether the presence of other metals is necessary for deposition of molybdenum and tungsten.

There is no conclusive evidence that any metals outside of this rectangle have been deposited from aqueous solutions. The published data on zirconium deposition[5] are "preliminary," and relate to deposits "that contained so little metal that weighing would have been of little value." The deposits were found spectroscopically to contain several other elements, the presence of which may have been necessary for the deposition of metallic zirconium, if indeed the latter was produced.

The published data on the deposition of columbium and tantalum are not conclusive. N. Izgaruishev and A. F. Prede[6] first reported that columbium could be quantitatively electrodeposited and thereby separated from tantalum. Later Izgaruishev and G. E. Kaplan[7] concluded that deposition of columbium was incomplete, in fact less than 10 percent of the columbium present could be deposited from alkaline solutions, or baths acidified with citric or oxalic acid. The cathode efficiencies were very low.

N. Izgaruishev and A. F. Prede[8] also reported that they had

3 L. F. Yntema, J. Am. Chem. Soc. **54**, 3775 (1932). W. P. Price and O. W. Brown, Trans. Electrochem. Soc. **70**, 423 (1936).
4 C. G. Fink and F. L. Jones, Trans. Electrochem. Soc. **59**, 461 (1931). M. L. Holt, Trans. Electrochem. Soc. **66**, 453 (1934). M. L. Holt, Trans. Electrochem. Soc. **71**, 301 (1937).
5 W. E. Bradt and H. B. Linford, Trans. Electrochem. Soc. **70**, 431 (1936).
6 Zeit. Elektrochem. **39**, 283 (1933).
7 Zeit. Elektrochem. **40**, 33 (1934).
8 Zeit. Elektrochem. **40**, 295 (1934).

deposited tantalum from baths containing glucose, salicylate or resorcin. However, their maximum deposits weighed only about 0.003g, and the cathode efficiency was less than 0.1 percent.

These data suggest that, as with tungsten, the presence and codeposition of some other metal is necessary to deposit either columbium or tantalum. Much further study will be required to prove that metallic columbium or tantalum, free from appreciable amounts of other metals, can be deposited from aqueous solutions.

It should be emphasized, however, that Fig. 1 is merely a statement of published results, and does not preclude the deposition of metals outside of the rectangle. It merely places a burden of proof upon those who report deposition of other metals. It is at least possible that certain borderline elements, including also vanadium and uranium, may be deposited with other metals in alloys that have special properties.

The fact that many rare metals can be deposited does not insure their practical application. Each application must depend upon the particular metal having properties that meet some unfilled need, and upon the ability to deposit the metal at such a cost that its use is justified.

Although it is possible to deposit all six of the platinum metals, practical applications have been suggested for only three, namely rhodium, palladium, and platinum. Of these, rhodium is of special interest because of its use on the surface of reflectors. Its reflectivity is only about 80 percent, as compared with 95 percent for a clean silver surface. However, the resistance of the rhodium to tarnish leads to a high reflectivity over long periods. Incidentally, a hardness of over 500 Brinell is reported for electrodeposited rhodium, although cast or rolled rhodium has a hardness of only about 200 Brinell. This illustrates the fact (shown also with chromium) that an electrodeposited metal may have quite different properties from the cast or rolled metal.

The relative abundance of the three metals, gallium, indium, and thallium increases in that order. Their electrodeposits may find special uses. The melting point of gallium (30°C) is below the boiling point of water. It can be deposited from alkaline

solutions[9], but thus far no practical applications of gallium plating have been suggested.

Indium may be deposited from both acid and cyanide baths[10]. Because of its resistance to tarnish and corrosion, which it also confers on certain metals with which it is alloyed, its use has been suggested on silverware (either directly or as an alloy deposited with silver); and in or on bearing metals, to protect them against corrosion by the lubricating oil.

Thallium may be deposited from perchlorate solutions[11], alone and also as an alloy with lead[12]. Although it is the least expensive of these three metals, no important uses for the electrodeposits have been suggested. The lead-thallium alloy is reported to be very resistant to acids.

Rhenium, one of the most recently discovered elements, can be deposited from various acid baths[13]. One striking property is its resistance to hydrochloric acid. Rhenium deposits oxidize rapidly in moist air[14].

While germanium may be deposited, the chief interest in its deposition is that the merest trace of germanium in a zinc electrowinning bath greatly reduces the efficiency of zinc deposition[15].

For completeness, those non-metallic elements that can be discharged from aqueous solutions are indicated in Fig. 1 by circles. Hydrogen is discharged at the cathode, because in this and other chemical properties it resembles the metals. The other non-metals are discharged at the anode. Under most conditions used in practical plating, oxygen is the only element likely to be set free at the anode.

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9 Review by H. C. Fogg, Trans. Electrochem. Soc. **66**, 107 (1934).
10 These methods are summarized by C. G. Fink and R. H. Lester, Trans. Electrochem. Soc. **78**, preprint (1940).
11 O. W. Brown and A. McGlynn, Trans. Amer. Electrochemical Soc. **53**, 351 (1928); and Discussion.
12 C. G. Fink and C. K. Conard, Jr., Trans. Am. Electrochem. Soc. **58**, 457 (1930).
13 C. G. Fink and P. Deren, Trans. Electrochem. Soc. **66**, 471 (1934).
14 G. E. F. Lundell and H. B. Knowles, J. Res. NBS **18**, 629 (1937); R.P. 999.
15 U. C. Tainton and E. T. Clayton, Trans. Am. Electrochem. Soc. **57**, 279 (1930).

See Historic Boston, Birthplace of American Liberty. Plan Now to attend the greatest Convention in A. E. S. History.

June 9 - 10 - 11 -12, 1941

Toward Better Foremanship

WILLIAM MAHER
Foreman Plater
Hunter Fan & Ventilating Co., Inc.
Fulton, N. Y.

AT our last meeting the subject of devoting some of our discussion toward better foremanship was brought up. We are all foremen in addition to being platers. Therefore, in line with the educational policy of the society, it is my belief that a study along these lines would be in order. The question arises: what constitutes a good foreman? I'll try to answer that.

He must, first of all, understand the work which he directs. He must have the ability to teach others. That sounds easy, but I know many good mechanics who are unable to instruct others. Therefore if a foreman, himself, cannot attend to that he must have someone in the department to whom he can detail the job. He must have a broad and open mind, capable of listening to others' suggestions and using them if they are good. He must have a personality that inspires confidence in his leadership. He must try to be just in criticism and not above praising good workmanship. We all like to know that our efforts are being appreciated. He must be cooperative and above all he should fit himself, by study, to be able to answer intelligently questions pertaining to his production methods.

That is something in which management is vitally interested. When a foreman cannot give the answer, management must seek outside aid.

That brings us to our pet peeve, an efficiency man. Now you realize as well as I that we know more about our own department than any outsider would be likely to. If we were to make a study of efficiency methods, together with our practical knowledge, there would be no need to go beyond the foreman.

This field of study is unlimited, and I believe we would find it most interesting. I wonder how many of you have ever given a thought to the subject of motion economy, or waste control. Such a program is not difficult to put in operation, but once they get to working you would be surprised at the beneficial results obtained.

I have been trying out a plan of motion economy, myself,

and I must say that I'm more than pleased with the results so far. I would like to see the branch take up this course of study, since more could be obtained by group discussion, and I know that we would all gain something of value to us in our chosen field of endeavor. I have prepared a chart that I use in my plan of motion economy. Of course this could be greatly improved, but it has answered for my present needs.

The object of this chart is to find out just where the time, consumed to produce a piece of work, goes and how much lost motion is involved. I consider this valuable, in the event of making out a plan of wage incentives. It is part of the time study man's stock-in-trade, and I like to be able to beat him to it. This is another reason for making the subject part of our program.

If the management decides to put in a piece, bonus or premium system of payment, he doesn't ask the foreman to set the price, that is put up to a time study man. Yet this is all part of what I think a good foreman should know, and not only know it but should be able to discuss intelligently his knowledge with his supervisor when that is called for.

I think such discussions here among ourselves will give us more self-confidence, when called to express our views to management. I know, myself, how many times I've left a conference tongue-tied. I could think of a thousand things I wanted to say but did not have that self-confidence needed to put it over and there must be more than me in that class; I've heard others do a lot of talking after a conference but they were as dumb as I in the office.

That's why management calls in the methods man or efficiency expert. He can talk to him in language they both understand, and which you and I could understand with a little time devoted to the subject of good foremanship.

I recall a plant in Ohio, that I visited last fall. They had just hired a new foreman. However, they kept the former man as his assistant. The assistant was a very good plater, so they told me; but he did not seem to know much about foremanship nor had he the ability to handle help.

How many of us really do know how to handle men in order to obtain the maximum in production? I think a little honest self analysis will convince most of us that there is room for im-

provement. Too many foremen take the view that it is necessary to instill fear of losing their jobs in their men. That is a serious mistake. A foreman, to get the most from a man under him must make that man feel that he is looking out for both their interests. For when all is said and done, a foreman must rely on the loyalty of his men for his successful maintenance of production. In other words, they must work as a unit. A good record of labor relations is a valuable asset to any foreman; and good labor relations come only when the rank and file of workers have confidence in the man in charge.

It makes a man pretty sore to be asked to do something that you can't do yourself; therefore, a good foreman will try to understand each operation performed in his department and if necessary be able to show how it should be done. That does not mean that he should have the fixed idea that his is the only way. There is where an open mind comes in handy; for the other fellow may have something better. If he has, be fair enough to give him credit. As I said at the start this subject has unlimited possibilities and the deeper we go into it the more we will find that is worth our time to study.

If the firm that employs you wants to send an efficiency expert into your department, I think everyone should give him all the help possible. At the same time, get as much help from him as possible. He is not looking for your job, but rather looking for something that you have neglected.

If you take up this subject for study, there will be very little that he can find to criticize in your department. Once you have decided that there is room for improvement in your conduction of the department under your control I'm sure your interest will increase to the point where you will be as efficiency conscious as any methods engineer.

We must all realize that today the object of every manufacturer is a better article at a lower cost. There is only one way to attain that objective. That is a comprehensive knowledge of how to use the tools at our disposal.

Most of us resent any change in methods especially if they are suggested by someone else; therefore, doesn't it seem logical that we should study our own methods and try without the aid of outside help to better them. This seems like a sales talk and perhaps it could be so construed.

I have become sold on the subject myself and can see so much that I believe would be to the advantage of all of us, that I am anxious to have you all take part in it. We could set aside a certain time for such discussions, leaving ample time for plating problems. Judging from articles I have read in trade papers, there must be many problems relating to foremanship. The N. M. A. has started a course of foremanship training and many of the largest manufacturing companies are sponsoring this training in their own plants; so there must be a need for it. At any rate, I hope you will all give this your careful consideration and if you decide to take it up let's make ourselves a promise that we will try our best to attend each coming meeting throughout the season.

NEW INVENTIONS PREDICTED AT MICHIGAN ALKALI GOLDEN JUBILEE

A prediction that amazing new inventions "perhaps dwarfing even the electric light, the telephone, the motor car and the radio" will come in the next 50 years was made by J. B. Ford, Jr., vice-president of the Michigan Alkali Company, as the great chemical company celebrated its fiftieth anniversary.

The celebration took the form of a dinner given in honor of 567 veteran employees who had served the company a quarter century or more. S. T. Orr, general manager, was toastmaster. Emory L. Ford, the president, spoke briefly.

In predicting the technological advances to be expected during the next 50 years Mr. J. B. Ford, Jr., said:

"Amazing technological changes have taken place in this country since our company was organized in the last decade of the nineteenth century; great inventions have wholly altered our way of life. The electric light, the telephone and telegraph, the automobile, the radio have welded a great American nation into a great people. The development of vast reservoirs of steam, electric and oil power have enabled our workmen to double and redouble their productive abilities until today our people enjoy a standard of living higher than that of any other people in the world. Even the most humble of us have comforts which are denied those in comparatively more fortunate circumstances in other lands—all because we have been able to utilize intelligently the vast stores of raw materials with which our country is blessed and put them to work for mankind.

"But we are only at the beginning. It is my firm belief that the things America is destined to do in the future will outstrip everything accomplished in the fifty years this company has been in existence. We can look forward to the day when our scientists will unlock the atom, opening up a source of boundless power, greater than the coal and oil stores of Mother Earth. Ways will be found to wipe out disease. New inventions will be made in the fields of transportation and communication. Rockets defying the force of gravity may supplant the motor car and the airplane. New developments in the field of chemistry will yield still greater economic benefits. Our Research Department is at work on many of these developments already.

"Possibilities which the future holds are boundless. We are not at the peak of our accomplishments today. We are only at the threshold of a period of greater achievement. I am supremely confident of this, and I am certain that the great American chemical industry of which our company is a part will play a leading part in the progress which is to come."

NEW ALUMINUM OXIDE POLISHING GRAIN

Vanite—a fused aluminum oxide produced in the electric furnace—is the trade name given to a new polishing grain by the Hanson-Van Winkle-Munning Co., Matawan, N. J., manufacturers of electroplating equipment and supplies. Vanite is a product of bauxite from which the impurities such as titanium oxide, iron oxide, silica, etc., have been removed.

Rigid control is maintained, by manufacturing to close specifications and careful inspection of the grain shape and size. The grains are of the "blocky" type, as nearly equi-dimensional as possible, and practically free from weak particles like flats and slivers which have inferior abrasive value. Grain size is closely controlled by screening and separation into "oversize", "nominal" and "undersize." The "nominal" is the control product; "oversize," coarser, and "undersize," finer. Each keg of Vanite is subjected to a careful screen analysis to determine the percentages of these three sizes and is kept within the specifications adopted for each grit size, in accordance with the U. S. Department of Commerce Bulletin R 118—30 entitled, "Abrasive Grain Sizes."

Capillarity or "degree of wetting" is one of the important properties of abrasive grains used with adhesives like glue, and Vanite is noted for its high capillarity. In order to maintain capillarity, the kegs of Vanite grain should always be covered when not in use and stored in a dry place. Grain should not be allowed to remain in the bottom of the trough for more than two or three days. Frequent cleaning of the trough will prevent contamination of the new grain by the old.

One of the outstanding advantages of Vanite is the consistent uniformity, from keg to keg, year in and year out, of the polishing grain with respect to size, shape and chemical composition, and consequently, its consistently uniform angularity, solidity, strength of grain, sharpness and high cutting action. Its high capillarity results in high adherence of the glue, and consequently the production of a strong wheel head which will give maximum polishing performance and economy. The adhesive recommended for use with Vanite is animal hide glue or abrasive cement.

Available sizes of Vanite polishing grain listed from coarse to fine, are as follows: 4 — 6 — 8 — 10 — 12 — 14 — 16 — 20 — 24 — 30 — 36 — 46 — 54 — 60 — 70 — 80 — 90 — 100 — 120 — 150 — 180 — 220 — 240 — F — FF — FFF.

The selection of the proper grain depends, of course, on the type of work to be done, the condition of the surface of the metal, the amount of stock to be removed and the final degree of finish required. However, a few examples of the sizes of abrasive grain used for specific operations may be cited from experience, as follows:

Shovel blades	36,	120		
Shovel handles	36,	90,	120	
Axes	60,	80,	120,	150
Automobile bumper bars	80,	120,	150,	220
Stainless steel, commercial finish	100,	120,	150	
Plows	36,	80,	150	

Valuable data on setting up, balancing and mounting of polishing wheels, the use of glue in the polishing room and full instructions for the use of Vanite polishing grain are available from the Hanson-Van Winkle-Munning Company.

See Historic Boston, Birthplace of American Liberty.
Plan Now to attend the greatest Convention in A. E. S. History.

June 9 - 10 - 11 - 12, 1941

AL HIRSCH CONTRIBUTES TO ADULT EDUCATION

Before completing his elementary school education, Al Hirsch began the serious part of his life as an apprentice to a Coach & Carriage Lamp Manufacturing Company, November 15, 1897. In that shop there were journeymen closeplaters, coach-lamp-makers and metal spinners. Everything in that factory, even to a small machine screw, was made by hand.

Ornamental iron, door handles, hub caps and in general all iron trimmings were closeplated. Closeplating is the art of soldering the coating, which was generally the solid metal like silver or the alloy brass to the iron trimming. The closeplater prepared the mounting by a hand method, even though a polishing lathe was at his disposal, that is to say, with chasing tools, files and emery cloth. The fixture was then carefully tinned, likewise one side of the thin sheet of metal that was to be the outside coating. Silver and brass were the popular finishes of the times. The apex of lightning rods were closeplated with platinum. Brick dust and machine oil were used to remove any solder that might have gotten on the outside of the coating. With a specially prepared three pound soldering copper the outside sheet of thin metal was sweated and soldered to the basis metal which was usually iron. A stick of wood with a piece of leather glued on it and jeweler's rouge was used to give the final finish.

Coach-Lamp-Making was comparable to high class tinsmithing. The bodies of the lamps were made of XXXX sheet tin-plate. The tin-plate after it was cut to size was then blocked into shape. To block metal it was necessary to have a trunk of a tree about two feet in diameter by four feet high (called the block) an indentation is made on the top face of the block with a specially designed hammer, the tin-plate is then raised by pounding it into the indentation with the blocking hammer. The linings of the lamps were made of silver roll plated copper. The silver side of the copper was hand burnished with a highly polished steel burnisher and a burnishing medium of soft soap made from ivory soap chips and a few m's of concentrated ammonium hydroxide.

At the end of a long apprenticeship, about eight years, and at the age of

twenty-two years Mr. Hirsch was made foreman of the plant. That same year the firm installed their first nickel and silver plating baths.

Hirsch got his education the hard way. He attended classes wherever the subject he wanted could be gotten in an afternoon or evening. For instance he completed his high school education between the Central Evening High School and the Y. M. C. A. of Philadelphia, Pa., mechanical drawing and electricity at Spring Garden Institute, machine design at the old Franklin Institute, chemistry at Drexel Institute. Finally after about nineteen years he graduated from the School of Arts and Science, Temple University, afternoon and evening department, in 1932.

Only one electroplater, Ralph Atkins, a member of Philadelphia Branch, can give testimony to the above facts as he worked with Al Hirsch during the period of years when Al would knock off work to go to some school.

In one single year (1938) Hirsch made three contributions to the A.E.S. The titles of his papers in the MONTHLY REVIEW are as follows:—

"*Anodic Deposition of Rubber*," Jan., 1933; "*Barrel Nickel Plating of Fabricated Sheet Zinc Parts*," Jan., 1934, p. 31; "*Efficiency of a Horizontal Plating Barrel*," Feb., 1935, p. 7; "*Cathode Efficiency of Electroplating Barrels and Its Effect on the Adhesion of Nickel Deposits*," Mar., 1938, p. 190; "*Nickel Plating of Zinc Base Die Castings and Fabricated Zinc in an Electroplating Barrel*," May, 1938, p. 353; "*Effect of Sodium Cyanide, Sodium Carbonate, and Rochelle Salt on the Cathode Efficiency of a Copper Electroplating Solution*," Nov. 1938, p. 823.

His best contribution to the electroplating industry is his work at the Jules Mastbaum Vocational Evening School, Philadelphia, Pa., where he teaches electroplating. For the past ten years this work has been going on silently and perhaps unnoticed, yet a soul and a secret subtle philosophy keeps it going. Hirsch thinks it is the grandest privilege to be afforded an opportunity to teach a Trade Extension Course. Trade extension work as applied to electroplating is teaching adults who have not had any previous technical education the science of chemistry and electricity, as it pertains to the electrodeposition of metals. Experience in this field of adult education brings out the important fact that men will attend classes provided they can learn something that will be a direct benefit to them. Young electroplaters come to school regularly because they want to become masters of their trade. Hence, this lifts the plating industry up on a little higher plane. Al Hirsch seems to have discovered a little trick, that is, if he were to ask platers to come to school and learn chemistry and electricity they would not come; so he invites them to learn more about electroplating. Hirsch has worn out three Blum & Hogaboom books teaching his classes and this year, he tells me, all the members of the class have purchased the book to be used as a text book in class. Three years ago a few members of the class completed an investigation of the silver bath at the school and reported it in the A.E.S. Convention Proceedings, June, 1938. This school year they have three graduate chemists in the class who, with a few platers, are investigating the effect of pH on the cathode efficiency of the nickel bath.

A census of the class for the past ten years has shown that all of the men have increased their salaries, ten have been made foremen, two have become laboratory assistants, another has been made assistant plating engineer in a large well-known corporation. All of the students sooner or later find their way into the A.E.S.

In 1938 Hirsch with full faith in the completed researches of the A.E.S. done at the U. S. Bureau of Standards, Washington, D. C., accepted a position that afforded a greater opportunity to serve our industry, at Snyder, Inc., Philadelphia, Pa., manufacturers of auto and radio accessories.

He is a member of The Pennsylvania State Association for Adult Education, The Electrochemical Society and The American Electroplaters' Society.

INDEX - 1940

January . . . December

JANUARY

Logozzo — Chromium Plating Plastic Molds 11
Augsburger — External Heating of Plating Solutions 23

FEBRUARY

Towner — A Talk to the Plater on Solution Analysis, also Complete Analysis of Nickel Solution 91
Butterworth — Metal Finishing Problems 107

MARCH

Anderson and Reinhard — Alkaline Cleaning and Copper Blistering 175
Tracy — A Discussion of the Common Complex Metal Cyanides in Cyanide Plating Solutions 195
Harper — Ventilation and Automatic Buffing 184

APRIL

Smith — Recent Developments in Bright Zinc Plating 255
West — Electric Cleaners 262
Bellinger — Silicates and their Application to Metal Cleaning 267
1940 Convention Program 253

MAY

The 28th Annual Convention 337
Broughton — Modern Practice in Plating Zinc Alloy Die Castings .. 339
Maurer — Bright Nickel Plating in Full Automatic Equipment 346
Program for 1940 Convention 357
Dayton Convention Fellowship Program 363
Report of Dr. Blum 365

JUNE

Cleveland — Solutions for Metal Cleaning 432
Promisel — Electropolishing 443
Faint — Loose Abrasive Finishing 449
Report of Executive Secretary 451

JULY

Shirley — Auxiliary Equipment for the Electroplater..... 511
Beckwith — Plating Shop Economics..... 523

AUGUST

Young — A Course of Study for the Electroplater..... 593
Dyktor — Some Common Health Hazards in the Electroplating Industry..... 597
Gardner — Some Odd Colorings on Brass, Copper, and Copper Plated Goods..... 611
Rules for Membership Campaign..... 615

SEPTEMBER

Wilson — A.E.S. Research..... 666
Green — Advanced Filtration..... 670
Sizelove — Some Kinks in the Preparation of Metal for Bright Nickel Plating..... 675
Oldam — Metallic Losses in Gold Plating..... 683

OCTOBER

Hull — Magnesium as a Control Agent for Zinc Anodes..... 747
Gebert — Corrosion Testing of Electrodeposited Metal..... 755
Eichstaedt — Polishing, Buffing and Plating Zinc Base Die Castings 761
Bregman — Placing a Plating Contract (Reprinted from July 4, 1940, issue of *Iron Age*) 765

NOVEMBER

Mankowich — Corrosion Resistance of Cadmium and Zinc Electrodeposits Under Marine Conditions..... 833
Walton — The Story of Abrasives..... 841

DECEMBER

Christmas Greetings from our Founder..... 919
Diecastings Shine in '41 (Reprinted from Nov. 25, 1940, issue of *Steel*) 920
Blum — What Metals Can be Electrodeposited from Aqueous Solutions?..... 923
Maher — Toward Better Foremanship..... 931
Year Index..... 938

Here and There

PHILADELPHIA BRANCH ANNUAL MEETING

Previous to the annual meeting of the Philadelphia Branch on Saturday afternoon, November 23, at the Broadwood Hotel, the Executive Board met at Camden, N. J., in accordance with the legal requirement that a meeting of the Society shall be held once a year in New Jersey, since we are incorporated under the laws of that state. All members of the Board were present. Many items of business pertaining to the welfare of the Society were discussed. The meeting lasted from 9 A.M. to 12. President Fulforth presided.

At 2:30 P.M. Harry Keller, president of the local branch introduced Dr. E. B. Sanigar as chairman of the meeting. The first speaker was Dr. Samuel Glasstone of Princeton University who spoke on "Overvoltage and its importance in Electrodeposition."

Dr. Blum then presented a paper entitled "What Metals can be deposited from Aqueous Solutions?" Vice-President of the A.E.S. Charles C. Conley's contribution was a paper on "Control in the Plating Room," while George B. Hogaboom's subject was "The Electroplater's Part in the Defense Program."

The subjects presented by the four speakers were very interesting, which was proved by the discussions that followed each paper. About 200 persons including some ladies listened attentively while the various papers were read and discussed.

THE BANQUET

The banquet at seven was characteristically Philadelphian, the spirit of brotherly love being manifested everywhere, 346 persons partaking of the good things provided. Beautiful door prizes donated by supply houses and plating companies kept both men and women in suspense for more than an hour, each one wondering if they held the lucky number. We felt sorry for Mrs. Jack Diamond. She wanted that last floor lamp, but no luck; anyway, she heard Ray Goodsell sing, if that's any consolation.

President and Mrs. Fulforth and the other members of the executive Board had a reserved table through the courtesy of the committee on arrangements.

We were glad to shake the hand of our good friend, Past-President of the Supreme Society, Tom Slattery, from Washington, D.C. Also Dr. and Mrs. Blum, Dr. Walter Meyer, Dr. Graham, George B. Hogaboom, Joe Underwood, Horace Smith and Mrs. Smith, Mr. and Mrs. George Wagner, Ralph Liguori and F. J. MacStoker of New York, Leroy Beaver, Al Hirsch, Wilfred McKeon, Leroy Critchfield, Mr. and Mrs. John Himes, secretary of Philadelphia Branch and a host of others.

The program from start to finish was a great success. Our thanks are extended herewith to the committees in charge for their untiring efforts in making these occasions more and more outstanding each succeeding year.

The gifts were among the best we have seen, the winners receiving something handsome and useful of which they may well feel proud. Ray Eckert and his committee are to be congratulated for the success of this part of the program. A floor show and dancing followed the banquet.

Dr. Sanigar made a splendid presiding officer. George Lang was General Chairman and George Gehling was watchdog of the Treasury. Both did a praiseworthy job.

All the New England branches as well as Lancaster, Baltimore-Washington, Newark, New York, Milwaukee and Dayton branches were represented.

Joe Barron, chairman of the Boston Convention Committee, and Andrew Garrett, Boston's genial Secretary came all the way from the Hub. Joe gave a nice little speech regarding the progress of the convention. We had breakfast with them on Sunday morning. How Andy fell for Philadelphia Scrapple.

MONTREAL BRANCH REPORT

The Province of Quebec was the object of our visit on Thursday, December 5. We left home on time, but due to snow and ice and poor railroad facilities we arrived in Montreal about 90 minutes late. The boys were still in session at the Mount Royal Hotel, however, and being in a jovial mood we talked over the problems of the local branch until midnight. Our good friend, John Feeley, started the discussion, by suggesting the possibility of organizing a chemistry class.

After much was said both pro and con, it was apparent that a class will be formed. The details are being worked out by Mr. Feeley and will be presented to the class for their approval. Up for action, too, was the subject of preprints of the convention papers. The Branch voted to recommend to the Supreme Society that the publishing of preprints be discontinued as being too expensive and of doubtful value unless the papers are mailed to the members at least a month previous to the Convention.

Montreal Branch has added five new members to their list with the prospect of more to follow. It was agreed on all sides that Mr. Hogaboom's recent visit to Montreal has helped to create considerable interest in plating. All the members were of the opinion that similar meetings would be a great benefit to the society.

We wish to thank President Harding and Mr. John Feeley, who is now the secretary, for the opportunity of telling our Canadian members about the Society's progress. For the hospitality provided by Mr. Feeley we are particularly grateful. We hope the ideas discussed will bear fruit and that the classes mentioned will be formed and well attended. Montreal Branch has a splendid group of young men, all holding good positions who are well qualified to undertake whatever responsibility is placed upon them. We like their spirit. Our visit was a delightful one and we hope it may prove to be a profitable one for all concerned.

$350.00 FOR A SUGGESTION

One of our members, Mr. Arthur Loggozzo, in charge of the plating department of the General Electric Company, Plastics Division, Pittsfield, Mass., was awarded a check for $350.00 by the company for his suggestion that iron oxide scale from mold surfaces could be removed by a pickling formula. His process includes the removal of carbon smut in an alkaline bath, using an anodic treatment followed by acid pickling, a wetting agent and an inhibitor to protect the steel from the acid is also used. This work was previously done by hand.

Mr. Logozzo's paper on the hard chrome plating of dies has appeared in the pages of the REVIEW and was read before the recent A.E.S. convention in Dayton. He has spoken on this subject before several New England branches. He is a member of Springfield Branch of the A.E.S., is twenty-eight years old and has held positions with International Silver, Remington-Rand, and Pratt and Whitney.

BRANCH SECRETARIES ATTENTION

At the semiannual meeting of the Executive Board of the A.E.S., held in Camden, N. J., on Saturday A.M., November 23, 1940, the following motion was carried: That all foreign members of the American Electroplaters' Society be excused from paying dues until this motion is rescinded by the Executive Board.

It is obvious that the above action was taken because of the hardship encountered in receiving money from our members in the countries now at war. No per capita tax needs to be paid for these members.

THE DETROIT MEETING OF THE A.E.S.

When almost one thousand persons,—964 to be exact,—come from all points of the compass to attend a meeting of the A.E.S., there must be a reason. In this case the reasons were threefold. First, it was the fourth year in succession that the Detroit branch has sponsored an annual educational session and banquet, the attendance increasing more and more each year. Second, the speakers on this year's program were outstanding. Prominent among these men was Dr. Charles Franklin Kettering, vice-president and director of General Motors Corporation, and director of General Motors Research Laboratories, whose address, "The Application of Modern Science to the Plating Industry," was listened to with the closest attention by over four hundred persons at the afternoon session.

Dr. F. A. Rohrman, Michigan College of Mining and Technology followed Mr. Kettering. He chose for his subject "Vagaries of Corrosion Testing." Mr. F. F. Oplinger, E. I. duPont deNemours Co., spoke on "Copper Plating." Professor Baker of the University of Michigan presided, being introduced by Walter L. Pinner, president of Detroit Branch. "A splendid program" seemed to be the unanimous opinion expressed by all who attended the educational session.

The third reason for the success of these functions is the elaborate banquet preparations, including the decorations, floor show, orchestra and dancing to say nothing of the meal itself, which is always a pleasant memory. In this connection also might be mentioned the 120 page official program containing a three page history of Detroit Branch, compiled by W. W. McCord the branch historian. The names of the 254 members of the branch are also included. There are approximately 95 pages of advertising in the program representing 120 companies supplying the trade with materials of all kinds from die castings and steel to instruments for measuring surface tensions as well as complete polishing and plating room set-ups.

May we be pardoned if our enthusiasm goes a little out of bounds regarding these meetings. If you have never attended one of them, you have a treat in store. The success lies in the fact that every member given a job to do does his utmost to attain perfection. Hence men like George Nankervis, "Mose" Cherry, A. B. Wilson, Carl Heussner, Wright Wilson, Walter Pinner, Wm. Phillips, Chas. Eldridge and W. W. McCord are some of those who have the planning in charge and whose efforts from year to year make the annual event at the Statler an outstanding event. Through the courtesy of Dr. Rohrman and Mr. Oplinger, their papers will be published in the REVIEW. Dr. Kettering's extemporaneous address was taken by a stenographer and will also be published.

We wish it were possible to name all the branches represented. We saw members from Chicago, Milwaukee, Dayton, Toledo, Anderson, Boston, Philadelphia, Cincinnati, Cleveland, and Waterbury. First vice-president Ellsworth Candee represented the Supreme Society, Joe Barron, Chairman of the Boston Convention Committee spoke briefly on the progress of the plans for next year's Convention at the Hub.

Toilet sets were given to the ladies while the gentlemen were presented with lead pencils.

The floor show was one of the cleanest and most enjoyable we have ever attended. The high type of men and women attending A.E.S. banquets, no matter where they are held, demand the best variety of high class entertainment. The banquet committees in recent years have been giving them just that.

Our efforts are too feeble to paint the whole picture as we would like. Suffice it to say that each individual member, be he branch officer, committee chairman, advertiser or friend of the A.E.S., deserves our warmest thanks for contributing to one of the best occasions we have ever seen in the society's history, conventions included.

HARRY L. REED, FOREMAN PLATER, HAS SEEN WARREN TELECHRON CO. GROW

Born in Boston, Mass., Harry L. Reed began working with the James W. Tufts Company of Boston in the year 1888. Starting as an errand boy and showing unusual aptitude for the tasks entrusted to him, he was given an opportunity to work in the plating department. Here he resolved to learn all he could about the electroplating business. It was here also that he saw the storage batteries which were then in use, superseded by the plating dynamo.

HARRY L. REED

Thoroughly interested in all phases of metal finishing, he became chief inspector for the Tufts Company before leaving the company in 1902.

Mr. Reed went into the manufacture of prize cups in 1902 and four years later sold his share of the business and accepted a position as superintendent of Simonds & Poor Carbonators Co., makers and finishers of soda fountains.

In 1909 he became finishing department foreman of the Randall Faichney Company of Boston, manufacturers of surgical instruments, afterwards being made factory superintendent. It was here that electro-cleaning was first introduced, which revolutionized this important operation in plating room production.

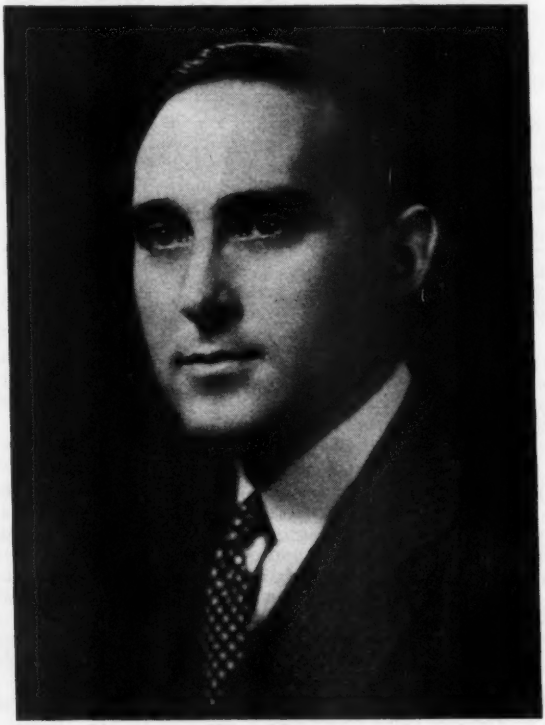
Mr. Reed went as factory superintendent in 1917 to the Framingham Screw Works which produced great quantities of material for the Ordnance Department during the World War. Acid zinc, a new process at that time, was used

by him at this plant to good advantage. He continued with this company until the close of hostilities when he went into business for himself.

Mr. Reed's connection with the Warren Telechron Company, clock manufacturers, at Ashland, Mass., started in 1929. At that time the company employed about 200 persons in the factory and made approximately 500 clocks per day. The production now averages from 8000 to 10,000 clocks per day with a total employee payroll of 1500 persons. New buildings are being added from time to time in order to meet the growing demand for Telechron clocks.

Splendidly equipped polishing, buffing, burnishing, and plating departments have been installed with automatic equipment including rectifiers, a full automatic machine for cleaning, and two semi-automatic machines for bright nickel and bright copper. All kinds of plating solutions are used including silver and gold, the base metals being steel, brass, and zinc base die castings. Up-to-date lacquer and enameling departments are under Mr. Reed's supervision also. The easy methods of handling the immense quantities of work passing through these departments prove the progressive spirit of the man who for over half a century has kept pace with the progress of the industry.

Through the courtesy of the Warren Telechron Company officials the delegates of the Boston Convention in June will be privileged to visit this modern manufacturing plant, unless something unforseen happens that may cause the convention committee to cancel their plans for plant visitations.



KENNETH BELLINGER, Librarian, Hartford Branch

WATERBURY BRANCH MEETING

Fifty men sat down to the Lobster Supper at the Hotel Elton on Friday evening, December 13. Then followed the joint meeting of the Hartford and Waterbury branches presided over by Joel Backus and Ellsworth Candee respective presidents of both branches. Over 100 persons listened attentively to Dr. Starek of United Chrome Corporation as he read his paper on Color Plating. Many questions were asked regarding the process which is still in its infancy. Samples were shown which were very favorably commented on. These specimens were beautiful in color and design and brought forth such remarks as, "The plating trade doesn't need to fear plastics or other new developments as long as such finishes as these can be produced on metals."

Mr. Farr, superintendent of Manning-Bowman Company of Meriden at whose plant the samples were finished spoke enthusiastically about the future of color plating giving his foreman plater Al Huber most of the credit for the success of the process in his plant.

The United Chrome Corporation is to be congratulated on this new accomplishment in the plating field. Dr. Starek's address was well received. He was given a great round of applause at the close of a most interesting and enjoyable session.

AGREES WITH MR. MANKOWICH

Gentlemen:—

In the October issue of your magazine is an editorial, signed, "A. Mankowich."

It's a good letter, in our opinion, and just what is needed in the plating industry—There are too many symbols, and different names for the same things. Plain language, as he says, is all we want.

Some of the papers written about plating remind one of bookkeeping. Some fancy accountants have a jumble of entries, additions, subtractions, on each side, and when all is said and done, it is nothing more than subtracting the credit from the debit, and you have what you made, on a deal or business.

—*No Signature*

A WARNING FROM THE NATIONAL CONVENTION HOTEL RESERVATION CHAIRMAN . . . .

At the Dayton convention last June, complaints were heard from last minute arrivals that no rooms were to be had, at the hotels. This could've been avoided, if the delegates and friends who attended the Dayton convention had reserved their rooms months ahead.

With the 1941 national convention approaching, Boston has arranged with HOTEL STATLER for 1000 rooms, which will house the entire National Convention next June, under one roof.

Our membership throughout the nation will receive a hotel reservation card in the mail which is a simple means of reserving your hotel room for next June. Upon receipt of this card please fill out same with the desired priced room or suite, and mail at once, no postage required. In doing this you will aid us in accommodating all who attend. Plan now to reserve your room, and attend the greatest convention ever held.

EDWARD C. DE LORME
Hotel Reservation Chairman

FUTURE ANNUAL MEETINGS

Grand Rapids	Jan. 18
Chicago	Jan 25
Buffalo-Toronto	Feb. 8
New York	Feb. 22
Newark	April 19
New England (Regional)	to be announced
Boston Convention	June 9-12
Baltimore-Washington	Feb. 8
Milwaukee	April 26

Business and Social News

BRANCH NEWS

Educational Activities

AMERICAN ELECTROPLATERS' SOCIETY

Waterbury Branch held its regular meeting November 8th in the Colonial Room of the Hotel Elton. Prepararation for the joint meeting of the Hartford and Waterbury Branches to be held in December with Dr. Stareck talking on Pattern Plating is under way.

Mr. W. L. Cassel has been appointed by the Chair as chairman of the Exhibit Committee for the 1941 Boston Convention. Mr. Cassel will collect all the material for this exhibit, and members are urged to get in touch with him relative to exhibiting material from their various organizations.

Dr. George Dubpernell reviewed the paper "Metallurgical Aspects of Hydrogen in Electroplating" by C. A. Zapffe and C. L. Faust, as given at the Dayton Convention and contained in the proceedings. Dr. Dubpernell has done a great deal of work on the effects of hydrogen on steel, much of his work being contradictory to that of the present authors who state that hydrogen does not dissolve in iron at room temperatures and only at more elevated temperatures. The balance of his paper is used to show that hydrogen does dissolve at room temperatures. It is well known that hydrogen embrittlement is relieved by heating steel to high temperatures. It is Dr. Dubpernell's observation that hydrogen is not dissolved in iron and steel, but is rather adsorbed.

Ralph Colter, as technical chairman, introduced Mr. A. W. Logozzo as the speaker of the evening. Mr. Logozzo spoke on "Chromium Plating of Plastic Molds," and was ably assisted in his demonstration by Mr. H. G. Batten. A large number of samples illustrating the work done were extremely interesting, and added much to the talk. Mr. Batten worked very hard at a small laboratory press producing small plastic coffee scoops which practically everyone in the audience desired.

SPENCER L. HENN, *Secy.*

Newark Branch held its regular meeting November 1, at the Club Room of the Hotel Douglas, Newark, N. J. President William T. Maguire presided. Other officers present were William Bruhns, vice-pres.; George Wagner, secy.-treas.; Roy Stout, sarg.-at-arms; Horace Smith and Paul A. Oldham, trustees.

Paul A. Oldam was appointed chairman for Newark Branch's Exhibit in the National Convention.

The question of Satin Chromium on steel, brass and aluminum die castings was discussed.

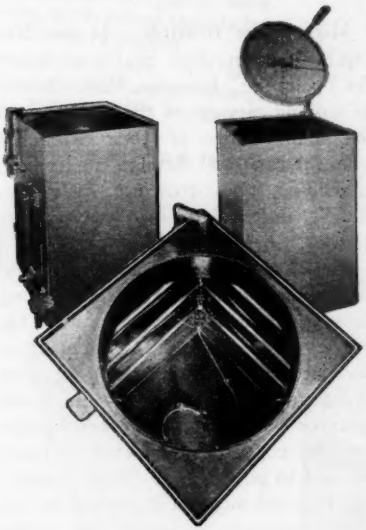
Applications for the following men were voted to take the regular course: Mr. Joseph Paul Mickiewicz and Mr. Carl D. Chambers to Active Membership and Mr. James J. Monagle to Associate Membership. Mr. Jack Gunther was reinstated to Associate Membership and Mr. Oswald Zorrer was reinstated to Active Membership.

Mr. Horace Smith who was appointed chairman of the Banquet Committee at the previous meeting announced that he had appointed all of the officers and the educational committee for the banquet committee. The committee has engaged the Ball-

Vorlexeddy

THE STORTS WAY of RINSING WITH SPRAY

MAKES EVERY DAY A COST-CUTTING PAY-DAY



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STORTS WELDING COMPANY

42 STONE STREET **MERIDEN, CONNECTICUT**

Manufacturers of Welded Fabrications to Specification

room of the Robert Treat Hotel for Saturday, April 19, 1941, for the afternoon and evening.

The guest speaker of the evening, Dr. Stericker of the Philadelphia Quartz Co., was next presented by Mr. Paul A. Oldam, acting Librarian. His subject was "Cleaning Procedure for Nickel Plating Brass and Copper."

GEORGE WAGNER, *Secy.*

Milwaukee Branch. At the November meeting Bob Shaffer of Snap-On Tools, Inc., Kenosha, Wis., showed us moving pictures of their plant, and the manufacture of their wrenches from the raw steel through the forging, machining, heat-treating, polishing, plating, buffing, and into the shipping cartons.

One of our members had an unusual experience which we feel is worth telling about. In fact, everyone should file it away in his notes. It happened on the third shift, where everything goes wrong anyway. In any case, a green operator was told to put some hypo into the copper if it started to plate red and to put some of "that" (pointing) into the nickel if it started to pit. Well, somehow or other the hypo managed to find its way into the nickel tank, and when the boss arrived in the morning the nickel was doing a very good cross between black nickel and galvanizing.

As sodium thiosulfate is a reducing agent, the logical thing to do to counteract its effects was to add an oxidizing agent. Hydrogen peroxide was decided upon. So about 5cc per liter was added to overcome the effects of a handful of hypo in 2000 gallons of solution. Lo and behold, in three shakes of a tail the nickel was plating better than ever.

Those who are not attending the meetings regularly are missing some good lectures. At the December meeting Mr. J. B. Niles talked about precious metals and their uses. His talk was very interesting, and should inspire us to acquire more knowledge on the uses of these metals.

DEXTER F. RHODES, *Secy.*

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ANACONDA
Copper Anodes
... because their unexcelled purity assures uniform corrosion, the highest quality deposit in the shortest possible time and low scrap losses. Furnished with suspension holes drilled as desired, or tapped for end hooks.
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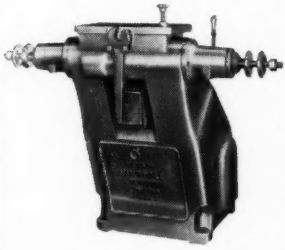
Milwaukee Branch Banquet

Milwaukee Branch will again hold its annual banquet and Educational Session at the Schroeder Hotel. This year we have selected April 26 as the date. This is on Saturday, and we hope to entertain as many of our friends as usual. The committee tells us that everything will be up to the usual standard.

Chicago Branch held its 343rd regular meeting November 9 at the Atlantic Hotel. Pres. Longfield opened the meeting; the other officers were in attendance.

The application of William H. Sa-

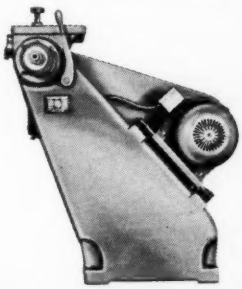


The H-VW-M Type MI Lathe is rugged in construction and the design eliminates vibration and assures smooth performance with long life. Spindle drive is through heavy duty high speed "V" belts which can be quickly changed by a new and simple method without disturbing spindle bearings or alignment. Any spindle speed within the range of 1800 to 3600 RPM is available, with other speeds by changing motor sheave pulley.

Among other features are "V" belt tension adjustment and lock, automatic spindle brake, bronze spindle nuts, continuous type N.E.M.A. motor with magnetic starter, and tray for composition and tools.

This lathe is furnished in 3, 5, 7½ and 10 H.P. sizes and motor is mounted inside base.

LATHES FOR METAL FINISHING



The H-VW-M Type MO Lathe has been designed for a range of work not requiring a heavy duty machine. ■ Spindle is of alloy steel and turns on circular flanged ball bearing units mounted at the ends of the housing for proper spacing and to rigidly support the spindle. A generous overhang for clearance is furnished.

Any one speed within the range of 1800 to 3600 RPM can be obtained through "V" belt drive, and by changing the motor sheave pulley; other speeds within this range can be had. Quick "V" belt change feature is provided without disturbing the spindle or bearing alignment.

Additional features include flat top spindle threads, right-hand end of spindle tapped for taper point, bronze spindle nuts, heavy cast iron machined spindle flanges, spindle lock, adjustable belt tension, continuous duty N.E.M.A. motor, and starter recessed against mechanical damage.

This lathe is furnished in 3 and 5 H.P. sizes with mechanical type starter and in 7½ H.P. size with magnetic type push button operation. Motor is mounted on rear in all sizes.

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franek, Jr., was read, and an investigating committee of F. J. Hanlon, R. Hazucha, and O. E. Servis was appointed.

Mr. H. A. Gilbertson reported on the progress of the Banquet Committee, and he, together with Rudy Hazucha, elaborated on this year's departure in the seating arrangement, whereby each ticket will entitle the holder to a reserved seat, according to a prearranged schedule.

Our Librarian, Oscar Weickmann, reported that plans for the educational session of the annual meeting are progressing in good order, with an excellent program in sight. He then introduced our speaker, Mr. H. Leever, who gave some of the practical points in the high-speed cleaning of steel by means of the new type cleaners.

E. A. LANZ, *Secy.*

Bridgeport Branch held its regular meeting Thursday, November 7, at 8:00 P.M. at the Stratfield Hotel.

President John E. Charleson opened the meeting with thirty-four members present, including Mr. Hartshorn and Mr. Buckman who attended as visitors.

Mr. R. J. O'Connor, chairman of the Membership Committee offered valuable information pertaining to the increase in membership to our Branch and Society.

Mr. Lawrence F. Griffin, Bridgeport Brass Co., Bridgeport, has been elected to associate membership and the transfer of Mr. Ralph McCahan from the Bridgeport Branch accepted.

The following members were changed from associate members to active members: Mr. A. Kenneth Schneider, 1198 Barnum Avenue, Bridgeport, Conn.; Mr. Edward Hill, Long Hill Avenue, Shelton, Conn.; Mr. Albert V. Kassery, 31 Houston Street, Bridgeport, Conn.

A good discussion was had on the subject that interest in open meetings should be increased. It was agreed to have Mr. Eugene Phillips as publicity agent, forwarding information and suggestions to increase the attendance of our Educational Sessions.

Mr. Milton Hodges of our Branch will give a brief talk on "Waste Disposal in the Plating Room" and Dr. Meyer will talk on "Blackening of Aluminum" at the next meeting.

An Old Timers' night was suggested as a Wm. Stratton night by Mr. George Wagstaff. It was voted to have such a night December 5. The following men have been appointed as a committee in charge: Eugene Phillips, Chairman, George Wagstaff, R. J. O'Connor, Wm. Flaherty, Ben Kusterer, Clarence C. Helmle.

It was agreed to have this Old

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Timers' night at Pjura's at 8:00 P.M. with a buffet supper and refreshments. The charge will be $1.00 and everyone interested will be welcome. For reservations, please notify the secretary or the committee in charge.

JOS. G. STERLING, *Secy.*

Newark Branch held its meeting Friday evening, November 15, at the Club Room of the Hotel Douglas. The meeting was called to order at 8:30 P.M. with Vice-President William Bruhns presiding. All other officers were present.

A communication from Executive Secretary William J. R. Kennedy with reference to preprints of papers scheduled for the National Convention was read. After considerable discussion on this subject, President William T. Maguire made a motion that the Newark Branch go on record as being in favor of furnishing, as soon as possible, to each member of the A.E.S., information concerning technical data prior to each National Convention. Mr. Horace Smith made an amendment to the motion, namely, that the aforementioned papers be published in the MONTHLY REVIEW one month prior to the Convention. The motion was then carried as amended and the secretary was instructed to inform Mr. Kennedy to this effect.

The request of Mr. Stanley Harris for a transfer from Newark Branch to Detroit Branch was read and granted. A communication and transfer card from Waterbury Branch was read and Mr. George Muscio was accepted as an associate member in Newark Branch. A request from Mr. Eugenio L. Villacorta of the Philippine Islands for a reinstatement was granted. Mr. Horace Smith reported progress on both the Christmas Party and the Banquet.

Our Librarian, Mr. Louis Donroe, next conducted one of his Information Please programs, asking some of the members to give brief talks on some of the unusual things that they have experienced in plating. He called on George Wagner who gave a very brief talk on "Tin Plating Twenty Foot Pipes both Inside and Outside." Mr. Paul Oldam was called on next and gave a talk and demonstration on "Brush Plating." Mr. Horace Smith's talk was on "Gold Plating and Gold Inlaying."

GEORGE WAGNER, *Secy.*

Los Angeles Branch. The November thirteenth meeting was called to order by President Bedwell. Mr. J. P. Roberts was accepted to membership.

The Picnic Committee was asked why the moving pictures taken at the picnic had not been shown. Alex Regmunt offered to show them at the next meeting. The members are all anxious to see if we have any latent Clark Gable in our midst.

Mr. Bruno Schindler was appointed chairman of the Branch Exhibit Committee for the National Convention in Boston. Mr. Rynkofs and Mr. Eldered were also asked to serve on this committee. Mr. Lamoureux explained

how the exhibits are judged. Mr. Lamoureux read from the Business Report the action of the Convention on the amendment offered by Los Angeles Branch.

The Librarian distributed copies of the paper on "Electropolishing Electrolytes" which were given to the members by Mr. Carlyle. The paper, given at the National Convention on Metallurgical Aspects of Hydrogen in Electroplating, was read and discussed by the members.

ERVIN FRAUENHOFF, *Secy.*

Hartford Branch held its November meeting at the Hartford Electric Light Company's building, Monday evening, November 18. At a short business session Harry MacFadyan, one of our oldest members, and one of the original organizers of our branch, was voted an honorary member in token of his many years of active service. At this writing "Harry" is confined to his home by illness and we all wish him a speedy recovery.

Mr. John Poor advised us of the educational program which he is preparing for the balance of the year. More details will follow later.

The speaker of the evening was Donald Wood of the Reed and Barton Co., silversmiths. He spoke to us on "Film Exchanges" in their relation to the preparation of metal for plating. His conception of the exchanges of films on the work in the entire cleaning cycle showed much thought and hard work, and presented an old subject in an entirely new light. The entire group of about forty members and friends was much impressed with the handling of this subject in this practical manner. Many questions were asked and all expressed their appreciation of Mr. Wood's address.

APLEY N. AUSTIN, *Secy.*

Pittsburgh Branch met Thursday evening, November 7, at the University Club. Mr. R. A. Dimon of Carnegie Illinois Steel Corporation was the guest speaker of the evening with the subject, "The Relationship of Sheet Steel to the Electroplaters' Problems."

Mr. Dimon drew comparisons between the plating characteristics of hot rolled and cold rolled strip and dwelt on the variations of hardness of cold rolled steel, depending on its cold working. The corrosion resistance of a deposit over steel is a function of the surface condition of that steel. When plating over a very smooth surface, the same corrosion resistance can be obtained by an extremely thin coating, as with a much heavier coating on rough steel. Mr. Dimon drew attention to the experiments of Mr. A. W. Hothersall, where he received a pore-free deposit of .0001" by using extreme care with his base metal surface and plating conditions.

Following the talk an intense discussion period brought out the following information:

1. The surface of strip steel usually

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has one side better than the other and it frequently pays to inspect the steel for the good side.

2. Sandblasting usually reduces the corrosion resistance of strip after plating.

3. Adherence of a deposit should be the same on cold rolled and hot rolled strip if the cleaning and pickling are proper.

4. The bond between a deposit and base metal is mostly a molecular attraction.

FRANK R. KELLER, *Secy.*

Lancaster Branch meeting was held in Harrisburg, on November 8, its first out of town meeting. Messrs. Kilheffer, Nuss and Snyder were in charge of the arrangements and did a good job. The meeting was attended by twenty-eight members and guests.

The speaker for this meeting was Dr. R. W. Mitchell, Technical Director of Magnus Chemical Co. His subject was "Some Experiences Related to Metal Cleaning."

Dr. Mitchell began with the basic reasons for cleaning and outlined the various factors which must be considered, such as formation of calcium soaps and how to overcome their formation. The speaker very cleverly pointed out the various types of cleaners and the important part which wetting agents are playing at present in the cleaning fields. The different types of wetting agents were described and their properties and application shown by actual experiments.

The Lancaster Branch was indeed fortunate in having Dr. Mitchell as their speaker.

We heard with extreme regret that Mr. Critchfield, our chairman, had accepted a position elsewhere and would find it necessary to resign as chairman of the Lancaster Branch. We will miss the work which he has been doing to promote the Lancaster Branch. At a business meeting on November 18 a new chairman will be elected to succeed Mr. Critchfield.

Following the educational period we journeyed to the plant of the Nuss Manufacturing Company for a social period.

H. L. HOVIS, *Secy.*

Providence-Attleboro Branch. After dinner at the Narragansett Hotel, the Providence-Attleboro Branch held its regular meeting at the Rhode Island School of Design. The branch was glad to welcome our Supreme Secretary, Mr. Kennedy, who gave us news of what was going on at other branches. He also presented the problem of preprints of convention proceedings and opinions of members were solicited. Whereas the value of

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ONE bath for ALL types of WORK or METALS

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Corrosion resistant.
Ideal for parts which must be soldered.
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preprints published some time in advance of their presentation at the convention was admitted, doubt was expressed of the benefit derived from preprints handed out at the convention with so little time for their consideration. The members were unanimous in their appreciation of the proceedings as now published which no one would wish to be without.

The speaker of the evening was Mr. George DeCamp of the New England Lacquer Company, who gave an excellent talk on problems of lacquer application and the means of correction. The talk was accompanied by demonstrations and many samples of finishes. A period of general discussion followed.

ROBERT D. MACLACHLAN, *Secy.*

Boston Branch met Thursday the fifth at the Statler Hotel, with President Jones in the chair and all officers present.

A questionaire, should preprints be given at the educational sessions was read. After much discussion the branch went on record as opposed to preprints at the future conventions.

Four applications were read for the second time and elected to membership as follows: Sylvester C. Pearsall, 349 Pleasant St., Malden, Mass., associate, James N. Kempt, 75 Lamartine St., Jamaica Plain, Mass., active, Harold F. Nash, 30 Grove St., Hopkinton, Mass., active, and Joseph C. Burak, 71 Gore St., Cambridge, Mass., active.

Our old friends Frank Clark and George B. Hogaboom were with us and in spite of the bad weather and traveling conditions about sixty-five members attended. One traveled more than one hundred miles and at least ten others came more than fifty miles to be on hand to welcome George B. Hogaboom and participate in his "Problem Night."

A. W. GARRETT, *Secy.*

New York Branch held two scheduled meetings during November in their headquarters at the Hotel Pennsylvania.

The first meeting on Friday, November 8, was a business meeting at which plans for the 1941 Annual Educational Sessions and Banquet and Dance were made. The date is Saturday, February 22, 1941 (Washington's Birthday). The Place: The Manhattan Room of the Hotel Pennsylvania, famed for its dining and dancing appointments.

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A holiday week-end for the founders day party.

The second meeting on Friday, November 22, was the Monthly Educational meeting at which Librarian Edwin Rinker, presented for the interest of the membership one of New York's own, Harold M. Lang, whose subject "Electropolishing" aroused a maximum of interest from the 65 members present and revealed much not commonly known about the formulae and processing of this comparatively new development of the metal industry. He exhibited a number of pieces of both unfinished and finished product that elicited high interest and praise from the membership and visitors in attendance. He did a real job before his own people and at its conclusion he was extended a rising vote of appreciation.

There were three applicants admitted to membership at these meetings and two applications filed.

F. J. MACSTOKER, *Secy.*

Dayton Branch held its meeting at the Engineers Club on Friday, December 6.

The meeting was called to order by President Cochran and then turned over to Mr. Wise who introduced our speaker for the evening, Dr. Wm. Stericker of the Philadelphia Quartz Company.

Dr. Stericker's subject was "Metal Cleaning" and was given in a most understandable manner. First classifying the different materials that are likely to be found on articles entering the cleaning bath, Dr. Stericker then discussed the different materials used to make up an alkaline cleaner and their actions, both good and bad, in removing foreign substances from the article being cleaned. Several slides were used to better illustrate some points. After answering several questions which followed his talk Dr. Stericker was given a vote of thanks.

The meeting was then turned back to Mr. Cochran for a business session, at which two applications were read and voted to take the usual course. Mr. Herman Austen, Mr. Clifford Ryan, and Mr. James Weaver were elected to membership.

Mr. Cochran announced that if his work at Wright Field would allow him to devote time to the job, Mr. Julius

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Teres would be asked to accept the chairmanship of the Exhibits Committee for the Boston Convention. Mr. Luechauer was asked to investigate the problem of whether the Dayton Branch would present a paper at the Convention in Boston.

After hearing remarks from Mr. Luechauer, Dr. Stericker and also from Dr. A. Kenneth Graham, one of our guests on the subject of preprints of papers for the Conventions, it was plain that the Dayton Branch was very much in favor of continuing this practice.

CORLISS W. POWELL, *Secy.*

Toronto Branch met December 6, at the King Edward Hotel, President A. Smith in the chair. Owing to the bad weather conditions and platers working overtime for the Christmas trade, the membership was hardly up to par. The guest speaker of the evening was Mr. W. A. Helbig of the Darco Corporation, New York. The absentee members missed one of the best and most interesting lectures ever given in the King Edward. The members were favored with a visit by Walter Barrows after more than a year's absence and it was a pleasure to shake the hand of the man that did so much for Toronto Branch. With him was Mr. Nash, an old time member and the dean of the Toronto Electrotypers. Letters were read from Mr. Arthur Collins of Boston and Mr. Kennedy. Mr. John Acheson spoke on the joint meeting to be held in Niagara Falls, Ontario, February 6. Mr. W. A. Helbig then took the floor.

His subject was "Activated Carbon." Mr. Helbig is an able speaker and explained in detail just what activated means and what activated carbon is for, stating that activated means brought to life, that carbon is vegetable lignite, that it is used on a large scale in sugar refining and many other chemicals, and that filtration of all plating solutions is the bone of contention. Also that it is a mistake to expect even a perfectly clean piece of metal to have a perfect deposit if it is plated in a dirty solution. Mr. Helbig gave a demonstration using activated carbon, red ink and water, also filter paper. He answered many questions and used the blackboard to show what was meant by wetting agent breakdown. A hearty vote of thanks was given the speaker by the

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members with an invitation to come again. Thank you Mr. Helbig.

J. S. CAIRNS, *Secy.*

Grand Rapids Branch meeting held November 14 in Rowe Hotel was attended by a large number of members and friends. President Maurice Caldwell opened the meeting promptly at eight.

Three new members were elected: Milton Freeman Haehnel, Grand Rapids, Mich., Ward Hubbard, Kalamazoo, Mich., and Leo P. Waite, Kalamazoo, Mich.

Announcement was made by President Maurice Caldwell, of the annual dinner dance and educational session to be held January 18, 1941. Members gave pep talks and comments were freely given to support this coming event.

Committees for the annual dinner dance program were appointed. Banquet committee—Mr. Stewart Martin, J. B. Haviland and Hugh R. Brown. Entertainment committee—Ivan C. Hepfer, Merrill M. Thompson and John Manning. Advertising—Chester W. Smith, F. D. Pace and C. E. Abel. For ticket sales and publicity—Homer Morton, Clyde Craven, Chas. Werft and Richard H. Alden. For Educational committee—Mr. L. B. Sperry and Maurice Caldwell. Plans are being made for this year's banquet to be larger with more entertainment and more educational talks.

Mr. R. E. Petitt of The Aluminum Company of America was the speaker for the evening, his subject "Aluminum and its Finishes" was accompanied by sound moving pictures and slides. A large display of polished aluminum parts and plated parts was mounted on panels and on exhibit.

C. E. ABEL, *Secy.*

Springfield Branch held its November meeting on the twenty-sixth at the Hotel Charles. The meeting was called to order by President Costigan.

The Secretary read a letter from Mr. W. J. R. Kennedy, explaining the cost of preprinting papers for the annual convention and questioning its value to the members. A discussion of the letter was requested. In view of the expense, and the fact that preprints are not distributed to registrants before the convention, it was decided that the value received is not worth the $400.00 expended. It was therefore unanimously voted that the Springfield branch go on record as opposed to further preprinting and distributing convention papers.

The application of Mr. Samuel Paul for active membership was read and accepted.

From a recent* report on a **STEELSHINE** buffing test.
"..three men picked the five samples in the order of their brilliance and in each case each man chose the same sample as best... STEELSHINE took the first honor."

Why not try STEELSHINE ROUGE and see for yourself? Made in a number of grades for all stainless steels and for chromium.
Particularly recommend **#7** – fast cut, little color: **#14** good cut and color: **#190 & #126** high lustre.
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The secretary read a letter from Mr. Ellsworth Candee, first vice-president in charge of membership, explaining the progress of the various Branches and suggesting methods for obtaining new members.

Mr. P. W. Prouty described the progress at the educational committee and stated that final arrangements for the plating class will be completed for the December meeting.

Because many members must travel such long distances to attend the meetings, Mr. Kennedy requested that we all cooperate by being in the meeting room promptly at 8:00 so the meeting can be started on time.

The president then introduced Mr. Arthur Logozzo of the Plastics Division of General Electric Company, Pittsfield, Mass., who presented an interesting paper on "Hard Plating Plastic Molds." He described the varied compositions of plastic materials, the necessity of plating plastic molds, and explained the plating methods employed at the General Electric Company. Mr. Logozzo's talk was well illustrated with slides, samples, and even a sample press which was busy turning out sample coffee scoops for the boys. After answering numerous questions Mr. Logozzo was given a rising vote of thanks.

D. S. HARTSHORN, JR., *Secy.*

Detroit Branch Introduces Innovation

Proposed by a Detroit Branch member, approved by its officers, and acclaimed by its membership, the November meeting was a proving ground for a new form of "Question Box." The success of the experiment was attested by the fact that when President Pinner asked for a show of hands by way of approval, enthusiastic applause made a vote impossible and unnecessary.

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High Production and High Quality Finish. Polishing or Buffing, are possible on HAMMOND Automatics. We build a comp ete line.
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The "Question Box" was conducted according to the procedure employed in the radio program "Information Please." A "Board of Advisers," consisting of Messrs. C. F. Nixon, B. F. Lewis, E. M. Baker, and L. K. Lindahl, (the latter being the guest speaker of the evening), took their places on the platform and all questions were first referred to them. By such a procedure those who asked questions were assured of complete answers. This fact resulted in some excellent questions, and because of the comprehensive answers given, there was a splendid discussion from the floor on controversial questions.

The results were indeed gratifying and it was enthusiastically agreed that this was far better than any plan previously tried. Everyone entered into the spirit of the affair and the Detroit Branch can recommend "Information Please" for better "Question Box" sessions.

Following are the questions and answers and some of the discussion:

Q-1. What is the normal life of the copper sulphide magnesium rectifier?

A-1. Not enough time has elapsed since these rectifiers have been used in production plating to give a definite answer. Experiments with small units have been in progress for nearly 15 years and no difficulties have been encountered except on overloading the units.

Q-2. How successful has been the manual regulation of the tank voltage using Rectoplaters?

A-2. On the 6 volt machines, the tank voltage can be regulated between 3 and 6 volts in any number of steps desired. Below three volts, regulation is not practicable on the standard units. When the unit is connected for operation at 12 volts, regulation can be obtained in any number of steps between 6 and 12 volts although this is usually not necessary since the 12 volt machines have their proper principal application in barrel plating and electrocleaning where close regulation of current is nor required.

Q-3. Is there any harmful effect in starting a Rectoplater at a full load?

A-3. None has been observed to date.

Q-4. At what pH values do the hydroxides of ferrous iron, ferric iron and cupric copper precipitate?

A-4. Ferric hydroxide starts to precipitate at a pH of 2 in the colloidal state. Ferrous hydroxide precipitates at a pH of 5.5 and cupric hydroxide at a pH of 5.3. These values are taken from "Hydrogen Ions" by Britton.

Q-5. What is the best method to replate work which has been polished, some of the nickel having been removed by polishing? What might cause the second deposit of nickel to peel on the backs of flat pieces?

A-5. The polished articles should be cleaned, preferably in a soak cleaner. No electrocleaning should be used, especially with reverse current, since this passivates nickel very badly.

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After cleaning, the work should be activated with acid, sodium cyanide or a copper flash from a solution having a high free cyanide content.

If chromium must be stripped off the work prior to cleaning, an acid strip should be used, or if an alkaline strip is used, a strong activating acid should be used subsequently, such as hot 6% sulphuric acid.

One of the members of the "Board of Advisers" at this point asked the question why the work was repolished before replating rather than stripped. He pointed out that if the work was blistered after the first plating operation, there might be a general tendency on all parts of the work for poor adherence and in this case, it certainly would be preferable to strip completely before repolishing.

Q-6. What lead or lead alloy is most suitable for tank linings, anodes, and heating coils for chromium plating?

A-6. Lead containing 6% antimony is very satisfactory. Pure chemical lead shows the least corrosive attack but cannot be kept in use constantly. The service depends somewhat on the concentration of the chromium plating solution. Chemical lead has a limited life in highly concentrated chromium baths. Lead containing 7% tin is becoming widely used for the above purpose and excellent results are reported.

Q-7. What is the relationship of polishing grain size to the economics of bright nickel plating? To eliminate the proprietary angle of this question, let us assume that the smoothening power or rate of brightening of the bright nickel solutions is a fixed factor.

A-7. The usability of a bright nickel is largely dependent on the polishing. If a mirror surface is required, nickel buffing will be necessary if #120 or #150 emery scratches are visible and possibly if #180 emery scratches show. Some authorities consider the use of gray nickel cheaper in such cases. However, it must be remembered that the finish required is a definite factor and if only small portions of the work require a real mirror finish, bright nickel is highly economical.

R. B. SALTONSTALL, *Librarian.*

(We wish to thank Dr. Saltonstall

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for his Question and Answer Report each month. (W. J. R. K.)

Cincinnati Branch meeting was held on December 5, at the Hotel Metropole. Letters were read from Mr. Nelson Sievering, and Arthur J. Mintie, pertaining to plated ware exhibits for the forthcoming Convention. Mr. Owen T. Towner, was appointed Branch Exhibit Committee Chairman. A letter from A. W. Collins, requesting the Cincinnati Branch to present a paper at the convention was also read. The secretary was instructed to communicate with Mr. Collins and tell him that the Cincinnati Branch will present a paper.

A letter regarding the distribution of preprint copies of papers to be read at Educational Sessions of the Convention was read. The Cincinnati Branch is in favor of the distribution of preprints only if said preprints are distributed at least thirty days before being presented so as to give the members time to prepare an intelligent discussion.

The following three applications for membership were ordered to take their regular course: Russell Wiese, Associate, August Schwering, Active and Edwin Woistmann, Associate.

A motion was made and seconded that the entertainment committee attend the next Board of Managers meeting to plan for a future event.

The remainder of the evening was given over to Mr. Carcey and Mr. Blum of the Kirk and Blum Manufacturing Company. They talked on the most efficient ways of fume and dust removal; methods of cleaning air and State Codes for health protection, after which a rising vote of thanks was given them.

MARTIN GANNON, JR., *Secy.*

Toledo Branch meeting was called to order by the president, Mr. Miner, at 8:00 o'clock November 7. After the reading of a letter from the Boston Branch, Mr. Ward Hunlock was named chairman of the exhibits committee. A letter from Mr. Charles C. Conley, concerning a joint educational meeting for the spring of 1941 was read, and discussed, and the secretary instructed to inform him, that Toledo would give their support and cooperation. Mr. Sines and Mr. Wiktorowski were named as co-chairmen of a committee to make the necessary arrangements for a party to be held in January. At this time Mr. May announced his resignation from the membership committee. The meeting was then turned over to the educational chairman, Mr. May, who introduced the speaker of the evening, Mr. Lindahl, of the Udylite Corporation. Mr. Lindahl spoke on the application of rectifiers to electroplating. At the close of his talk he devoted a full half hour to answering questions, at the end of which the branch extended him a rising vote of thanks for a very interesting talk. The remainder of the session was turned over to the librarian, Mr. Harry E. Moser. The following questions were found in the question box:

Q. What effect will 4 oz./gal. of sodium, or magnesium sulphate, (in a watts sol.) have on the nickel deposit?

A. Makes the deposit brighter, and slightly more brittle.

Q. What effect will chromium have on a Rochelle copper bath?

A. Neutralizes the alkali, efficiency drops, cathode becomes passive, causing discoloration, and peeling.

Q. What is the best method for pickling cast iron, without bringing out the graphite?

A. It's better not to pickle. Polish, or sand blast.

Q. What is the best method for re-

moving carbonates in a cadmium sol. without freezing?

A. (a) no other practical way. (b) du Pont has a patented chemical process, but no one seemed to have had any experience with it, (c) barium hydroxide.

Q. How is nickel plated out of cathode sheets and what is advantage?

A. There seems to be no advantage other than it might run 10 cents a pound cheaper than regular anodes, only one plant known to be using cathode sheets or squares in Detroit, this place is using them in 3 tanks. Cloride content must be very high to get corrosion, throwing power is cut down. It is known to be successful on one job only. 5% of anodes used are squares, 95% regular anodes.

GASTON BERGEMAN, *Secy.*

Philadelphia Branch meeting was held at The Harrison Laboratory on December 6. Four applicants, that had been approved by the Board of Managers, were elected to membership in Philadelphia Branch. Six new applications were read and turned over to the Board of Managers for approval.

Mr. John W. Himes was appointed chairman of the exhibit committee for Philadelphia Branch. There was quite a discussion on the subject of preprints of papers read before the convention. A motion was finally passed and the secretary instructed to write the supreme secretary the results of the discussion.

Mr. A. Robson, chairman of Philadelphia Membership Committee asked for more cooperation from the members of the branch when he reported on his office. The Banquet Committee reported a success, both financial and educational.

Librarian Zurback introduced Mr. Clarence Smith of Philco Radio and Television, who spoke on "Recent Developments in Bright Zinc Plating." The subject proved very interesting and quite a discussion was started. Everyone present agreed that Philadelphia Branch should have more speakers like Mr. Smith who is a practical man and talks to the practical plater.

Librarian Zurback requested that one member of the branch talk for five minutes or so on some subject of interest to the practical plater each meeting night in addition to our regular program.

The meeting adjourned about 11:00 P.M. with the officers of Philadelphia Branch wishing everyone A Merry Christmas and Best Wishes for a Happy New Year.

JOHN W. HIMES, *Secy.*

St. Louis Branch meeting was held Friday, December 6. President being absent, vice-president C. Simon opened the meeting.

One elected to membership: Mr. J. F. Bubela of 1879 S. 14th St., St. Louis, Mo. One application was read and turned over to the board of Managers. This man is the son of one of the first members of St. Louis branch, now dead, Mr. C. E. Heil, 1259 Sheridon, Wichita, Kansas.

Letter read from Mr. E. Sievering in regard to plated ware exhibit at the coming convention. Mr. Musick has been appointed chairman from St. Louis.

Letter read from Mr. Kennedy in regard to printing reports of convention. It was suggested that preprints be sent to each member and just print the discussions in the proceedings, and arrange them so they can be put in a loose leaf binder and not in the book form. Also suggested that preprints

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O. S. True, U. S. Rubber Co.—The Uses of Rubber in the Electroplating Industry.
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be sent in place of the REVIEW for the month preceding the convention.

Letter also read from Mr. A. W. Collins appealing to Branches for papers to be prepared on "Practical Plating."

Mr. R. M. Errington was appointed chairman and instructed to gather all information from members as to what would be a good subject and report at the next meeting.

Meeting was turned over to Librarian J. Vogt, who introduced Mr. E. M. Errington (Rudy) who spoke of Rheostats, went into all the doings of Volts, Ampere and Ohm., explained the why and wherefore in the drop in Voltage. Many questions were asked and answered so that everyone could understand. He also spoke about Meters and Shunts. All in all it was very interesting.

The January meeting will be held on January 10, 1941, and February will be on February 14. Any one passing through St. Louis might like to stop and attend our meeting.

Happy Christmas to all the members.

CHAS. T. MCGINLEY, *Secy.*

Pittsburgh Branch meeting was held Thursday, December 5, at the University Club. A motion was made that a membership drive be made in January, February, March and April, to increase the size of the Pittsburgh Branch. As an incentive for the drive it was suggested that the member receiving the greatest number of new members be given a free trip to the Convention at Boston. Between now and the January meeting a committee of Messrs. Herring, Saylor, and Keller will make a list of the available men in the Pittsburgh District for membership. Mr. Honnecker suggested that all supply men in the branch be given a quota of new members to get.

The speaker of the evening was Mr. W. A. Helbig of the Darco Corporation who gave a talk on "Activated Carbon for Electroplating Solutions." Mr. Helbig brought out in his talk that filtering with activated carbon is a mechanical removal of impurities. While activated carbon should never be added to the plating tank, the most efficient method of cleaning up a solution of impurities is to pump the plating solution into an auxiliary tank and thoroughly mix the activated carbon with the solution for fifteen or twenty minutes so that the solution comes in intimate contact with the carbon. While it is impossible to lay down a hard and fast rule of the amount of carbon required to clean up a solution, one to two pounds of activated carbon per 100 gallons of nickel solution will generally clean up any solution of organic impurities. Organic material, clean soap, wetting agents, and brightening agents are removed by activated carbon most readily, but inorganic colloidal material is sometimes removed.

While it is not as efficient a process as mixing a slurry of activated carbon and plating solution, a bed of activated carbon in the filter press through which the solution is continually filtered will prevent the solution from building up in impurities. Since activated carbon is a reducing agent, it should not be used in that manner if potassium permanganate, hydrogen peroxide, or other oxidizing agent is present.

The next meeting will be held January 9 instead of January 2 at the University Club.

FRANK R. KELLER, *Secy.*

Cleveland Branch meeting was called to order at 8:30 P.M. by our vice-president Harold Seitz in the absence of our president Mr. R. Lyons

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who was attending the dinner meeting of the Detroit Branch. The weather was cold and dry and we had an attendance of 30.

The minutes of the previous meeting were read and approved. The following applications for membership were read and turned over to the Board of Managers: Melvin E. Weaver, Prop. Advance Plating & Finishing Co., 127 E. Woodland Ave., Youngstown, Ohio, Active; William Herbert, Northern Ohio Plating Co., Res. 9241 Birchdale Ave., Active; William Henry, Birger Div. Republic Steel Co., Res., Trump Rd., N.E., Route No. 4, Canton, Ohio, Active; John Hallack, Allied Plating Co., Part Owner, Res. 277 E. 156th St., Cleveland, Active; Geo. Winterstein, Electroplating Works, 3951 St. Clair Ave., Cleveland, Ohio, Active.

The following candidates were elected to membership: Edward L. Cableck, 2636 Taylor Road, Cleveland Heights, O.; L. E. Hummel, 17317 Franklin Boulevard, Lakewood, Ohio.

Mr. J. Singler was appointed by the chair to officiate in his usual capable manner on the project of getting exhibits for the coming Boston Convention.

The next subject discussed was the letter from our Executive Secretary in reference to preprints at conventions. Two members expressed a wish to have preprints and eight opposed, the balance not voting. Given a choice, the proceedings were favored. Motion was made that as a suggestion, there be a little more liberality shown in the printing of proceedings.

Some members would like to have discussions on cost methods used in plating plants and some effort will be made to secure a speaker on this subject.

Mr. John Honnecker our librarian then introduced our speaker of the evening, Mr. Geo. B. Hogaboom who is well known to our members and always welcome.

Mr. Hogaboom talked on plating problems in general and new developments and included a question and answer period.

FRANK J. OPATRNY, *Secy.*

Buffalo Branch held its regular meeting in the Bailey Bowling Academy, Friday, November 13. When called to order by president Joe Ruff there was a large attendance. The usual business was concluded by the reading of a financial statement by Treasurer Mr. Frank Nowakowski. It was decided that in future, our meetings would have a more practical trend. Dēmonstrations of analyses and operation of solutions would be conducted. The necessary apparatus for this has been generously offered gratis, by several members.

The meeting was devoted entirely to a lively discussion of practical plating problems, in which president J. Ruff and Dr. Wernlund took an active part. After the various questions had been thoroughly thrashed out a fish fry and refreshments followed. In the course of this Joe Ruff and Dr. Wernlund were again much in evidence with their stories. Their repertoire seems to be unlimited and provides an enjoyable means of spending the long winter evenings. RODERICK MCGHEE, *Secy.*

TO ALL OUR MEMBERS

Each branch secretary has been given copies of Tentative Specifications for Plated Coatings on Zinc, Cadmium, Nickel, and Chromium on Steel as approved by the A. S. T. M., 1940.

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The Abstract Section

CHARLES C. CONLEY, *Chairman, Program and Educational Committee*

Electrolytic Processes for Metal Finishing. By E. J. DOBBS. *J. Inst. Production Engrs.* **18,** 343-9 (1939). A brief review of anodic oxidation of aluminum, chromating of magnesium and its alloys, and hard chromium plating of steel tools and surfaces subject to abrasion. Magnesium alloys are also finished by immersion in a solution of selenous acid or an acid solution of a selenite. The red-brown film of selenium makes an excellent base for painting. Zinc chromate in a tung-oil paint, followed by a cellulose coating pigmented with aluminum leaf is recommended.

M. W. SCHWARZ
Chemical Abstracts **34,** 2714 (1940).

Electrolytic Processes in Magnetic Fields. By N. P. FEDOT'EV and A. I. EVSTYUKHIN. *Trudy L K KhTI* **1939,** No. 7, 32-41; *Khim. Referat. Zhur.* **2,** No. 5, 83-4 (1939); *Chemical Abstracts* **34,** 2715 (1940). The effect of a very strong magnet with field perpendicular to the direction of the current in an acid copper bath caused variations in the distribution of the copper deposit on the cathode; areas to which the current was diverted by the magnet received a heavier plate than others. A strong stirring was imparted to the electrolyte by the magnet. The conductivity of the solution was reduced. The effects were small in comparison with the magnetic strength.

ERNEST H. LYONS, JR.

Apply Thin, Uniform Ground Coats by Electric Deposition. By A. E. BADGER and BURNHAM W. KING, JR. *Ceram. Ind.* **34,** 41 (Feb. 1940). A preliminary experiment shows the possibility of applying enamel composition to iron by means of electrophoresis. A series of samples so prepared is shown.

HERBERT S. WILLSON
Chemical Abstracts **34,** 2715 (1940).

The Polishing, Plating, and Anodizing of the Aluminum Light Alloys. By E. E. HALLS. *Metallurgia* **21,** 123-6 (1940). Some practical pointers are given.

J. L. GREGG
Chemical Abstracts **34,** 2714 (1940).

The Electrodeposition of Indium from Sulfate Baths. By COLIN G. FINK and RAYMOND H. LESTER. *Trans. Electrochemical Soc.* **78,** (Preprint 14) (1940). Indium is a rare metal occurring with zinc; its present price is about $240 per ounce. It is resistant to corrosion, and increases the corrosion resistance and surface stability of metals with which it is combined. The effects of various additions to the indium sulfate plating bath were studied.

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The following bath gave the best deposits: 0.10 *M* In_2O_3, 0.30 *M* H_2SO_4, 0.0173 *M* $Al_2(SO_4)_3$, and 0.0075 g./l. gelatin; c.d. 3.25 amp./sq.dm.; temperature 26° C.; current efficiency 30-40%. It was found that an equation of the form: $\log (1 - e) I - m \log eI = b$, in which m and b are constants, e is the current efficiency, and I the current density, accounts for variations of current efficiency with current density for indium, zinc, and manganese; a theoretical derivation is given.

ERNEST H. LYONS, JR.

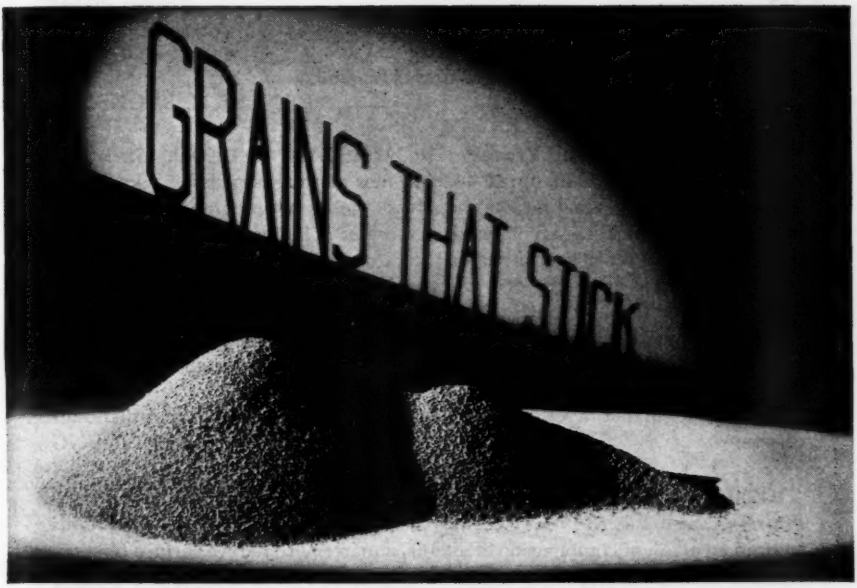
Glycerine "Foots" as a Brightening Agent in Cadmium Cyanide Baths. By F. C. MATHERS and W. J. GUEST. *Trans. Electrochem. Soc.* **78,** (Preprint 12) (1940). Glycerine "foots," the residue remaining from glycerine distillation in soap manufacture, was found to be a much more effective brightener in cyanide cadmium baths than goulac. Because of the variable composition of different specimens of "foots," it is necessary to determine the amount needed in each case. The bath composition was: cadmium oxide 6, sodium cyanide 16, sodium sulfate 6.7, "foots" 1.3-6.7 oz./gal. For maximum brightness, the plated work should be dipped momentarily in a 1% nitric acid solution.

ERNEST H. LYONS, JR.

A Study of the Kinetics of the Reactions in the Zinc-Hydrogen Irreversible Cell. By J. IRVING JOLLEY and H. V. TARTAR. *Trans. Electrochemical Soc.* **78,** (Preprint 10) (1940). The rate at which zinc (in contact with platinum) dissolves in solutions of hydrochloric acid, sodium bisulfate, and acetic acid at various concentrations and temperatures was studied, together with the effects on this rate of adding sodium chloride to these solutions, and sodium acetate to acetic acid, and of adding acetic acid, potassium chloride, potassium bromide, and sucrose to hydrochloric acid. It was concluded that the solution rate depends not on the viscosity of the electrolyte, as in a diffusion-controlled process, but is inversely proportional to the total resistance of electrolyte and cell, and to some function of the acid concentration. The similarity to "local galvanic couples" is discussed.

ERNEST H. LYONS, JR.

Electrodeposition of Bright Copper. By LAWRENCE GREENSPAN. *Trans. Electrochemical Society* **78,** (preprint 13) (1940). Bright copper plates comparable to commercial bright nickel deposits have not hitherto been obtained. The following solution gives brighter copper than other baths: $CuSO_4.5H_2O$, 100 g./l. (13.4 oz./gal.); diethylene triamine 80 cc./l. (10 fl. oz./gal.); ammonium sulfate, 20 g./l. (2.7 oz./gal.); temperature 60° C. (140° F.); c.d. 40 amp./sq.ft. with agitation, though 130 amp./sq.ft. has been used; 3-5 cc./l. concentrated ammonia is added daily, and wetting agents are used to reduce pitting. The solution must be kept clean. Rubber-lined tanks and filtration are recommended. Die castings and steel must be flashed in a copper cyanide solution before entering this bath. After copper plating, bright nickel and chromium are applied without buffing. Rolled electrolytic copper anodes are used, and the anodic c.d. is kept below 15 amp./sq.ft. The solution



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ERNEST H. LYONS, JR.

New Belgian Pickling Process. By ALASTAIR McLEOD. *Steel*, **107**, No. 10, September 2, 1940, pp. 40-44. The new method of pickling is known as the de Lattre Process and retains the advantages of hydrochloric acid solution by using as the pickling agent ferrous chloride. The pickling liquor contains one gram-molecule per liter of ferrous sulfate, one to two gram-molecules per liter hydrochloric acid and one gram-molecule per liter sulfuric acid. The solution is used from 50°-55°C. Only sulfuric acid is consumed in the process. The losses of hydrochloric acid are small mechanical losses. In order to use this process an inhibitor consisting of gelatin, peptonized by hydrogen chloride is present in the pickling bath.

The article further describes methods of recovering chemicals and disposals of wastes.

C. B. F. YOUNG

Alkalis for Metal Cleaning. By DR. T. K. CLEVELAND. *Metal Finishing*, September, 1940, pg. 479. Modern alkaline cleaning compounds contain an alkali or combination of alkalis, a material to reduce surface tension, and a softening agent. The active Na_2O is an essential factor in determining the value or life of a cleaner. It may be obtained by titrating with a standard acid, using phenolphthalein as an indicator. Cleaners of high pH are better suited for difficult cleaning operations. When used as an electro-cleaner, the conductivity of the solution is an important consideration. The pH can be used as a rough indication of the solution's relative conductivity. Use of wetting agents is explained. Charts and curves illustrating relative conductivity, pH etc., of alkaline compounds also given.

Surface Tension of Plating Solutions. By D. S. HARTSHORN, JR. *Metal Finishing*, September, 1940, pg. 476. Mechanism of wetting and methods for measuring surface tension described. Uses of wetting agents in alkaline cleaners and acid dips explained and requisits for ideal wetting agent in nickel solutions itemized.

The Reactions of Zinc and Iron in Hot-Dip Galvanizing. By DR. IGN. HEINZ BABLIK. *Metal Finishing*, September, 1940, pg. 486 and October, 1940, pg. 530. The author explains the numerous chemical and physical factors which govern the formation and composition of iron-zinc alloys formed in hot galvanizing. Equilibrium diagram of zinc-iron binary alloys and photomicrographs showing effect of bath temperature, immersion period, shape of piece, etc., are given.

Blue Gelatine-Copper. By WILDER D. BANCROFT and T. R. BRIGGS. *Metal Finishing*, October, 1940, pg. 537. Authors explain method of producing a peacock blue color on copper, nickel, brass and platinum. The metal is first electrolyzed cathodically for not more than 5 minutes at .15 to .45 amps/sq. dm. in a 1 to 2% solution of either copper acetate or propionate containing

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.325% gelatine. The electrolyzed piece is then rinsed and immersed in a 5% solution of copper acetate for a few minutes. The final dip is required to develop the blue color. Further experimental results are given.

D. S. HARTSHORN, JR.

Variables in Silver plating Solutions. By A. E. NICOL. *J. Electrodepositor's Tech. Soc.*, **16**, 15-21 (1940). The composition and the operating conditions of a cyanide silver bath can be varied over wide limits, but the most satisfactory deposits are obtained only under certain conditions. The Ag content of the bath should be 4.0-5.4 oz./gal. The maximum current density that can be used is 7-10 amp./ft.^{2} The amount of free KCN in the bath should be equal to the amount of KCN that is combined with the AgCN to form the complex salt. There has been some difference of opinion on the optimum concentration of carbonate in the bath. The author shows that the throwing power of the bath is poor if the K_2CO_3 content is below 8.0 oz./gal. and recommends a concentration of 8.5-12.0 oz./gal. The small amounts of Cu which may accumulate in an Ag bath as an impurity do not deposit, but serve no useful purpose. Articles made of parts united with soft solder should be plated in an Ag bath which contains no brightener, as in the presence of the latter the soldered joints may remain unplated.

A. BRENNER

Protective Coatings Against Corrosion Fatigue of Steel. *Metals and Alloys*, August 1940, p. 208, in a composite. Rapid failure of a stressed steel piece under corrosive conditions shows need for some kind of protection where this type of service is to be met. The work of Dolan and Benninger of the University of Illinois and John N. Kenyon of Columbia, studied fatigue failure of metals in a corrosive atmosphere. Results are summarized below:

Metal and Coating	*Coating Thickness*	*Ratio—Endurance Limit in H_2O to End. Limit in Air*	*Investigator*
SAE 3120 Quenched and Tempered	.....	0.224	
SAE 3120—Cadmium plated	.0001	0.254	Dolan
SAE 3120—Zinc plated	.00015	0.418	and
SAE 3120—Cyanided	.004	0.238	Benninger
SAE 6120—Nitrided	.020	0.809	
SAE 1020—Silicon impregnated	.020	1.000	
Bead Wire—No coating		0.522	
Bead Wire—Bronze plated (Displacement)		0.352	Kenyon
Bead Wire—Bronze plated—Electrolytic		0.276	
Bead Wire—Copper-Zinc plated		0.520	

Results: Plating with a more noble metal, as copper, actually speeded up embrittlement. No embrittlement was found in wire that was galvanized before copper plating. Zinc Plated specimens had better value than cadmium coatings, but platings were thin. Nitrided specimens gave high value and high endurance limit, while silicon had high ratio, but low endurance limit.

This shows another use of the protective value of zinc and cadmium plating in preventing this very rapid corrosion cracking of steel. Undoubtedly, thicker coatings would have still higher values.

PHIL J. RITZENTHALER

STAINLESS STEEL POLISHING COMPOUNDS

Are Proven Every Day in Every Kind of a Metal Working Plant

"4-A" Polishing Compounds Are Faster, More Efficient, More Economical for Polishing, Mirror Finishing of All Kinds of Steel, Including Stainless Steel and Other Alloys.

Use it on any kind of a wheel, soft, hard, medium. Results will speak more eloquently than anything we could say.

Tell us about your toughest job, and we'll be glad to send the "4-A" product that will solve your problem. No obligation, of course.

CEMENT AND THINNER

Instead of glue, use "4-A" Cement and Thinner, a uniform substitute for Polishing Wheels, Belts, Buffs, Rolls, etc.

Samples of Compound or Cement sent on request.

HARRISON & COMPANY

HAVERHILL, MASS.

Membership Report

ELLSWORTH T. CANDEE, *Chairman, Membership Committee*

To December 1, 1940

ELECTIONS

Thomas K. Allison, 528 E. 59th St., Indianapolis, Ind.
Active, Indianapolis Branch

Leland E. Bass, 430 E. 48th St., Indianapolis, Ind.
Associate, Indianapolis Branch

Edward Bruck, 824 Graham Ave., Indianapolis, Ind.
Active, Indianapolis Branch

Harold P. Chase, 1430 W. 23rd Street, Indianapolis, Ind.
Associate, Indianapolis Branch

Arthur R. Ferguson, 3810 North Central, Indianapolis, Ind.
Associate, Indianapolis Branch

George A. Fisher, Jr., 3726 North Meridian St., #34, Indianapolis, Ind.
Associate, Indianapolis Branch

Stephen A. Free, 5115 Norway Drive, Indianapolis, Ind.
Associate, Indianapolis Branch

Anthony J. Fritz, 1232 Blaine Ave., Indianapolis, Ind.
Active, Indianapolis Branch

Fred P. Green, 4231 Guilford Ave., Indianapolis, Ind.
Associate, Indianapolis Branch

Edward Grund, 1109 North Oakland Ave., Indianapolis, Ind.
Active, Indianapolis Branch

Richard J. Hennessy, 516 Chester St., Indianapolis, Ind.
Active, Indianapolis Branch

John M. Hood, P. R. Mallory Company, Indianapolis, Ind.
Active, Indianapolis Branch

Ralph B. Howard, 119 Tripps Ave., Indianapolis, Ind.
Associate, Indianapolis Branch

Otis R. Jones, 326 East Minn. St., Indianapolis, Ind.
Active, Indianapolis Branch

Albert P. Kriese, 905 York St., Indianapolis, Ind.
Active, Indianapolis Branch

Paul D. La Hue, 1305 Mills Ave., Indianapolis, Ind.
Associate, Indianapolis Branch

E. H. McCown, 1026 Sheldon Street, Indianapolis, Ind.
Active, Indianapolis Branch

Henry A. Meilke, 2913 Broadway, Indianapolis, Ind.
Associate, Indianapolis Branch

James A. Miller, 307 North Temple Street, Indianapolis, Ind.
Active, Indianapolis Branch

Lee T. Nichols, 2347 North Del. Street, Indianapolis, Ind.
Associate, Indianapolis Branch

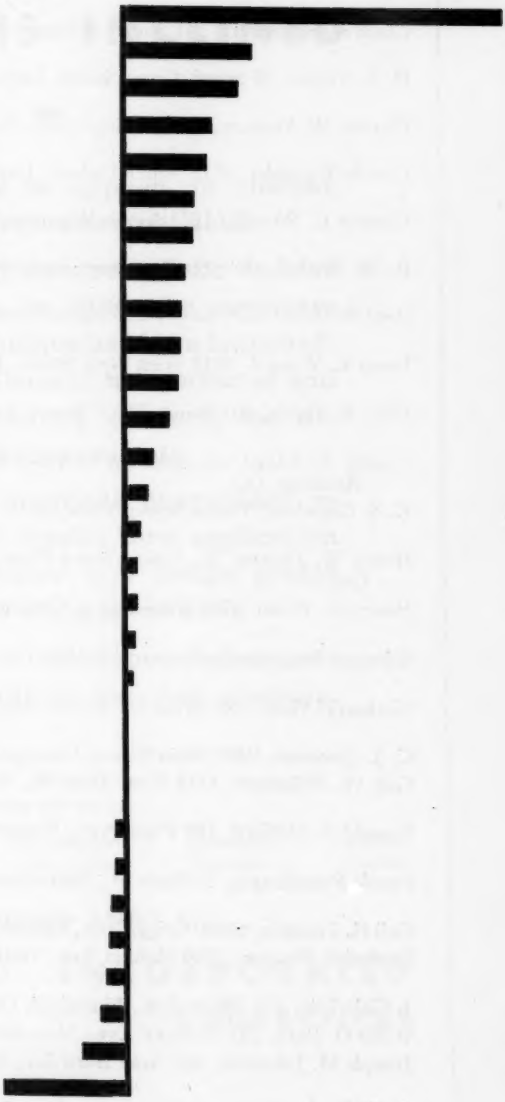
Donald L. Patrick, 1230 North King Ave., Indianapolis Branch
Associate, Indianapolis Branch

Elroy A. Pearsall, R. C. A., Indianapolis, Ind. Active, Indianapolis Branch

Edward F. Repp, 829 Fourth St., Columbus, Ind.
Associate, Indianapolis Branch

Membership Campaign

BRANCH	May 1, 1940	Change in Membership	Percent Change
Lancaster	25	+16	+64
Springfield	51	+12½	+24.5
Montreal	23	+5	+21.7
Boston	79	+13	+16.5
Grand Rapids	52	+8	+15.4
Dayton	62	+8	+12.9
Cincinnati	36	+4½	+12.5
Waterbury	66	+7½	+11.4
Anderson	38	+4	+10.5
Rochester	62	+6½	+10.5
San Francisco	20	+2	+10
Prov.-Attleboro	38	+3	+7.9
Cleveland	70	+3½	+5
Toledo	40	+1½	+3.8
Milwaukee	84	+2	+2.4
Newark	125	+2½	+2
New York	102	+2	+2
Pittsburgh	34	+½	+1.5
Philadelphia	133	+1½	+1.1
Los Angeles	59	0	0
Bing.-Syracuse	22	0	0
New Haven	115	0	0
Detroit	250	—3½	—1.4
Chicago	225	—3½	—1.5
St. Louis	77	—2	—2.6
Bridgeport	71	—2	—2.8
Toronto	67	—2	—3.3
Hartford	45	—2	—4.4
Baltimore-Wash.	49	—4	—8.2
Buffalo	57	—13	—22.8



NOTE: Honorary members are included with each Branch.

David N. Ross, Ross Ad-Seal, Inc., 738 Lord Street, Indianapolis, Ind.
Active, Indianapolis Branch

Harry B. Smith, 335 Whittier Place, Indianapolis, Ind.
Active, Indianapolis Branch

David S. Stoker, Allison Engineering Co., Plant I, Speedway City, Ind.
Associate, Indianapolis Branch

Clark A. Swinehart, 262 South Arlington Ave., Indianapolis, Ind.
Active, Indianapolis Branch

H. S. Taylor, 36 South Cruse Street, Indianapolis, Ind.
Associate, Indianapolis Branch

Charles W. Walters, 5934 College Ave., Indianapolis, Ind.
Associate, Indianapolis Branch

Garvin Wampler, 1715 North Oxford, Indianapolis, Ind.
Associate, Indianapolis Branch

Chester C. Weekly, 1123 North Warman Ave., Indianapolis, Ind.
Associate, Indianapolis Branch

R. M. Wirrell, 1026 Shelby Street, Indianapolis, Ind.
Active, Indianapolis Branch

Ovel Withers, 2229 East Washington Street, Indianapolis, Ind.
Associate, Indianapolis Branch

Louis E. Worrell, 3410 West 10th Street, Indianapolis, Ind.
Active, Indianapolis Branch

Elias B. Smith, 103 South Third Street, Columbia, Pa.
Active, Lancaster Branch

Dudley C. Lloyd, c/o Johnson Matthey of Canada, Ltd., 606 Cathcart St., Montreal, Que. Associate, Montreal Branch

K. S. Crawford, Union Screen Plate Co. of Canada, Ltd., Lennoxville, Que.
Associate, Montreal Branch

Henry W. Downs, Jr., Union Sreen Plate Co. of Canada, Ltd., Lennoxville, Que. Associate, Montreal Branch

Henry G. Wood, 5769 Christopher Columbus Street., Montreal, Que.
Active, Montreal Branch

Edouard Bouleh, c/o Accessories Mfg. Co., 641 St. James St., Montreal, Que.
Active, Montreal Branch

Nathaniel Hall, 1702 West 1st Street, Brooklyn, N. Y.
Associate, New York Branch

C. J. Queenan, 1000 Main Street, Coraopolis, Pa. Active, Pittsburgh Branch

Guy W. Wilberger, 1118 West Main St., Waterbury, Conn.
Associate, Waterbury Branch

Donald A. Hilliard, 169 Plaza Ave., Waterbury, Conn.
Associate, Waterbury Branch

Frank Passalacqua, 16 State St., Waterbury, Conn.
Associate, Waterbury Branch

Gail H. Templin, 16800 Griggs Ave., Detroit, Mich. Associate, Detroit Branch

Frederick Wagner, 1249 Holden Ave., Detroit, Mich.
Associate, Detroit Branch

J. Gale Idle, 271 Helen Ave., Mansfield, Ohio Active, Dayton Branch

Willis O. Park, 121 Western Ave., Mansfield, Ohio Active, Dayton Branch

Joseph M. Johnston, 665 Brae Burn Rd., Mansfield, Ohio
Associate, Dayton Branch

C. H. Fuchs, 34 North Benton St., Mansfield, Ohio
Associate, Dayton Branch

" AS THE TWIG IS BENT THE TREE IS INCLINED "

This truism may be applied to current trends in the metal-cleaning field.

When MacDermid announced the Anodex Cleaning Process in 1938, the complete cleaning cycle technique had been launched. Since then, MacDermid has perfected and released other cleaning methods for die castings and nonferrous metals.

The Pioneers of methods guaranteed to produce improved results thru application of modern chemistry and design pledge continued activity along these lines.

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Wrist Watches

A New Development in
THE LEA METHOD OF FINISHING

Ad-Lea-Sive as the Foundation for Lea Compound

It's spreading like wildfire — this use of Ad-Lea-Sive as a precoat for sewed buffs and polishing wheels. It makes Lea Compound adhere more firmly. Time out for compound application and for making new setup wheels is greatly reduced. Production is stepped up.

At New Haven they use Ad-Lea-Sive and then Lea Compound on a felt wheel instead of a 120 aluminum oxide polishing wheel. They report not only considerable time saved but an even finer finish.

Why not look into the merits of this most recent of Lea developments — Ad-Lea-Sive — the precoating of sewed buffs and polishing wheels to increase your production?

THE LEA MFG. CO. WATERBURY, CONN.

Specialists in the Production of Clean-Working Buffing and Polishing Compounds